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100 miles from the East Coast (p. 42)

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Secretary Ripley's comments

The view from the castle

Change has rocked the world since that voyage to New Guinea, years before the war; but changes in 1980s may be good ones

This past autumn I went to the Peabody Museum at Salem, Massachusetts, to see, after many years, a film taken on my first expedition, the Denison-Crockett Expedition to New Guinea. I hadn't seen the film since well before World War II but had a chance to read once more selections of my first book, *Trail of the Money Bird* (1942), and to reread Charis Crockett's book about her anthropological experiences, *House in the Rain Forest* (1942). Seeing the film, seeing myself and friends and companions of the time, all except two of whom are now dead, brought back the times with a rush. And the excitement and vague sense of presentiment that accompanied our setting sail in a 60-foot Alden-designed schooner from a pier in Philadelphia, down the Delaware River and the Inland Waterway to the sea, through the Panama Canal, and on to New Guinea, 12,500 miles and ten months later.

It was in December 1936, 43 years ago. We had cleared Currituck Sound and anchored for the night in Albemarle Sound, a fog-shrouded expanse. As I wrote, "It was marvelous fun standing up in the bow and watching the ricks and ricks of ducks and geese swimming ahead. We would bear down on them suddenly out of the fog and off they would go spattering across the water to get up speed, the coots and canvasbacks with a staccato beat like hailstones falling in the water, the Canada geese slower, more deliberate, with wild cries, *ah-uck, ah-uck, uck, uck uck*! Once we saw some swans, a thin white undulating line moving with slow dignified sweeps of their great wings along the horizon. In among the ducks were a few flocks of phalaropes, little gray sandpiper-size birds, bobbing about busily with infinitely small insect-like movements."

Tied up to a bank one evening we heard the dramatic abdication speech of King Edward VIII. "How bitter he sounded as he said that his brother had a wife and family while he was alone," I wrote in my diary. We speculated about what this meant for the future.

Next month we commence a new decade. On Chesapeake Bay recently I noticed how much the patterns of waterfowl populations have changed. The air is now full of the clangor of hundreds of thousands of Canada geese, almost a plague of them. Snow and blue geese are found on Blackwater wildlife refuge where none occurred in 1936. Swans are now found grazing on fields inland, so much of the waterweed growth has disappeared, and ducks are far less numerous, although still to be found on Currituck and Albemarle. Back then we knew a war was coming; now we feel less sure, only little wars are everywhere, and violence and genocide seem a commonplace.

But sit in the bow of a small boat, nosing through the chill of a fog-shrouded evening, and listen to the spattering of ducks and coots taking off in front somewhere, and faith is renewed. The patterns change and yet remain the same. In this the darkest time of year I smell the withered sedge, old leaves and gaunt, bare cypress stirring gently. Soon again it will be dawn and slowly renewal will be upon us, and a sense of shifting seasons. I take courage from the thought that this can be a decade of hope and fulfillment, as adventurous perhaps as our own sailing off years ago halfway around the world.

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Around the Mall and beyond

It took a long time to tear down the structure in front of the castle where the Pope stood and sat and blessed and prayed and delivered his homily on October 7. It was a raised wooden platform, as you can see (above, during ceremony), like a flattopped hill jutting out into the Mall. It was banked with flowers and evergreens. The Smithsonian didn't put it up, mind you, but it happened on my beat so I couldn't pretend not to notice.

Behind the papal throne stood the reredos, a half-roofed wall with steel beams, a sort of backdrop for the Mass. That

took a while to dismantle. It effectively screened off the statue of the Smithsonian's first Secretary, Joseph Henry. Without the backdrop, Dr. Henry would have seemed to be hovering disconcertingly over the Pope.

The onlookers on the Mall that cold, rain-spattered day were obviously ready for a nod from heaven. You never saw such a smiling, squeaky-clean, well-behaved lot of Moms and Dads and Juniors and Sisters in your life. They crowded around the papal hill with their plaid blankets and aluminum-and-plastic lawn chairs. They lined the curbs along the motorcade route while hundreds of cops faced them, closely spaced, rocking back and forth on their heels, eyes searching for anyone who might require a quick zapping with gun, mace, handcuffs, radio, keys, pencil, notebook, whistle, or any other odd bits of accoutrement. In *that* crowd? Fat chance!

For six hours the tide of people came in, engulfing the center of the Mall and washing around the hill. One young man had a pet raccoon on his shoulder. One couple played backgammon imperturbably while others stepped over them. A monarch butterfly wobbled overhead on its determined migration. A Park Police horse fell asleep in a patch of sunlight while its rider gave solicitous directions to a young woman.

The Pope was late. I found a place on the route just opposite the Air and Space Museum. The windows and doors were crowded. Orville Wright had the best view, lying up there on the wing of the Kitty Hawk *Flyer*.

Pope John Paul II is welcomed to the Smithsonian castle by Secretary Ripley and (center) Chancellor Burger.

At last the motorcycles and cars swept by and there he was, the most popular foreigner, I suppose, to visit us since Lafayette came in 1824. He swept up to the castle, was greeted by Secretary Ripley and the Institution's Chancellor, Chief Justice Warren Burger, was ushered in to meet some Smithsonian Regents and former Regents, signed "Joannes Paulus P P II" in the guest register, looked at portraits of noted American Catholic religious figures and was

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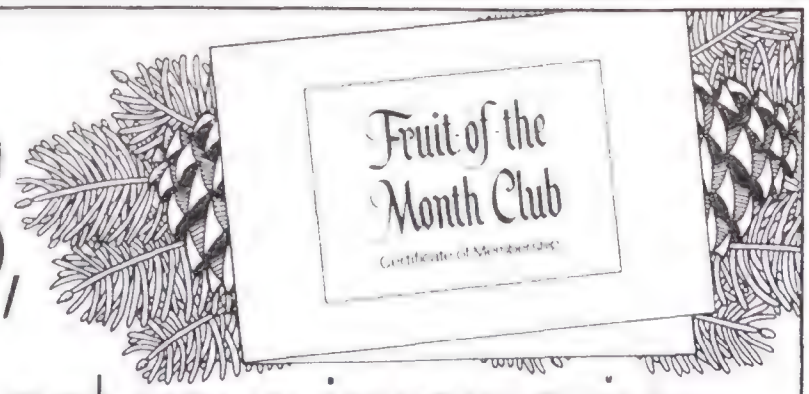

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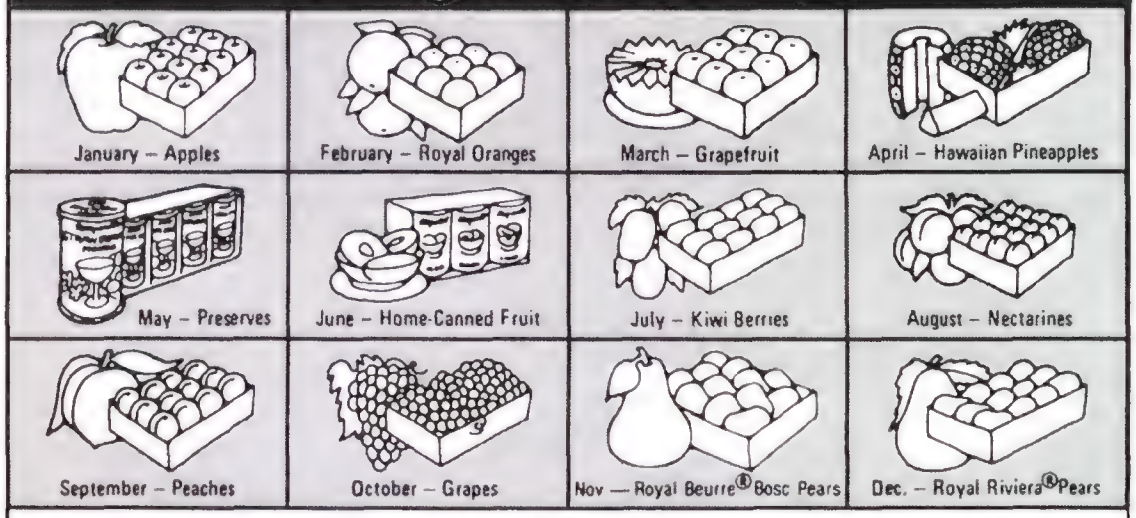

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presented the Smithson Medal by Chancellor Burger.

Throughout this interlude the Pope managed to say all the right things, show interest in everything he saw and wave to onlookers. Then he disappeared to vest for the Mass on the Mall. This must have been a strange moment for him—a shifting of gears from VIP visitor to devout priest all in a few minutes. I suppose that's what a pope must be able to do.

By the time he appeared on his "stage," I had moved closer—and so had thousands of others. All who had lined the streets were now converging on the castle, an inexorable ocean of people moving sedately, still smiling, saying "oops, pardon me," when they bumped one another.

This was the moment when the crowd may have reached close to 200,000. And then, after the Pope came into view in his green chasuble and began the service, the tide gently turned. Curiosity was quenched. A glimpse had been afforded of the father figure that so many Americans seem to yearn for. The rain blew in, icily, on a north wind. The living room back in the suburbs seemed extra appealing. In ones and twos, then in small trickles, people began to drift away.

A million or more had been forecast for this last great papal appearance in the United States. Instead, a fifth of that, at most, showed up on the Mall. Perhaps Washingtonians simply drew the line at the special bravery this attendance required. After all, these people of the nation's capital have for years coped with living at ground zero. They have been facing, at close range, such assaults on their sensibilities as recurring Congressional pay raises, the Internal Revenue Service, the private lives of government figures, the Dallas Cowboys, snow, jet noise from National Airport, five o'clock traffic on the Shirley Highway and joggers on the Mall. The prospect of facing a million of themselves was more than they could bear.

The Smithsonian museums drew many people in the morning, especially at the rest rooms. At the Museum of History and Technology the book store had four books about John Paul II in the window. At the National Gallery a woman with "Marshal" written on an armband was fast asleep in the Founders' Lounge. And on one of those soft sofas in a nearby gallery another woman had dozed off in front of *The Baptism of Christ*

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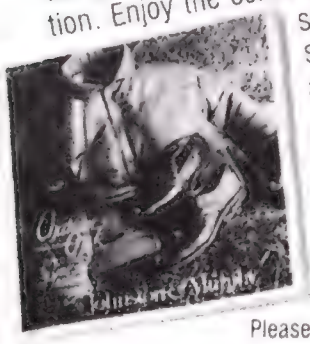

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(Nicolas Poussin, 17th-century French).

A week after the Pope had gone I met the husband of a Washington woman who had been publicized in the press because she had known John Paul II when she was a girl back in Poland. I asked if she had met him.

"Oh yes," replied the husband. "He talked with her for a while."

"What did they talk about?" I asked.

He didn't know exactly. Ordinary things. But the thought kept niggling at me. What do you say to a pope whom you used to know years ago? "Well, hi there! How've things been going with you? Pretty good, eh?"

No matter. It's all over now. The stage is down, and all that plywood and all those board feet of stringers and beams and braces and sills and rafters have been carted off for recycling. The iron framework of the reredos has been wrenched from the ground. The grass is recovering. And Joseph Henry stands again alone, his view of the Mall unobstructed, his gowned figure uncloseted, able to concentrate once more on electrical inductance. He was, incidentally, a Presbyterian.

The Pope's visit, of course, should be considered in context. Religion was pretty big on and around the Mall last fall. Long before John Paul II arrived, the Dalai Lama came through town surrounded by a number of lesser lamas. The spiritual-and-temporal refugee leader of Tibet called in at the Freer Gallery, where he was greeted by Secretary Ripley —who is an old hand in the Himalayas.

It was surprising how many of the audience in the Freer auditorium bowed their

Dalai Lama takes time to scrutinize Oriental art at the Freer Gallery.

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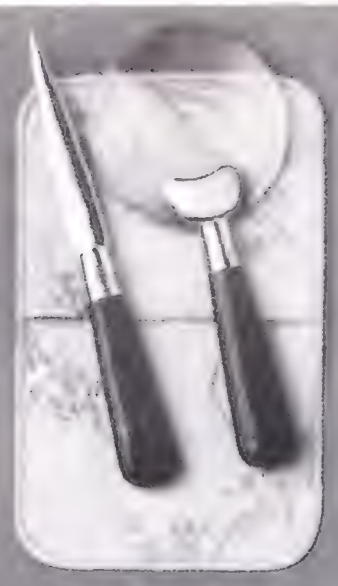

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heads and touched their fingers together in the gentle, prayerlike gesture that serves very nicely as a greeting to Tibetans. The Dalai Lama arrived slightly late (all religious leaders do, apparently), bowed and smiled and made the little greeting gesture to everyone he met, was shown some of the Freer's collection (p. 16) and then settled down in the auditorium to watch a number of brief films about Tibet.

These were the first products of a Tibetan study by the National Anthropological Film Center, directed by Dr. E. Richard Sorenson. The program was seven unedited "snippets" (Sorenson's word) dealing with aspects of Tibetan culture, as seen in exile areas. We saw festivals and rites, a quite detailed scrutiny of day-to-day life in a small village, a fascinating view of the training of young monks and my favorite, monks practicing dialectics and philosophical inquiry.

In this, the gowned students would rise to their feet and make their intellectual points to seated listeners who would, in turn, respond to them. As Dr. Sorenson says, the object is not to win a debate but to explore the truth. You didn't have to understand what was being said (I noticed that the Dalai Lama chuckled at a few remarks) to get the idea that this was the art of discourse.

Certain movements and gestures seemed to be normal parts of the procedure. A student would rise, carrying his prayer beads over his shoulder, and as he spoke he would clap and point almost simultaneously. It was a wonderfully expressive gesture. You can do it by thrusting your right hand forward, striking the palm of the left as it passes. It's as though you were saying "Gotcha!"

Dr. Sorenson says that it's really a gesture that signifies the eradication of ignorance—represented by the left hand—by the wisdom of the Buddha—the right hand. It plays an important part in Buddhist philosophy, and I think it's a good gesture. I've been doing it a lot. My wife thinks it's rude, and the people at the office don't pay any attention.

Several things about Tibetans came clear through the Anthropological Film Center's snippets. They are an attractive bunch who don't seem to get angry with their children or with one another. Tiny little Tibetans, learning to be monks, were treated with remarkable patience and warm kindness by the elders. Babies, barely able to walk, were cared for with the same humor and affection by older siblings.

Just before the Pope arrived in Washington a Revivalist group set up a tent near the Washington Monument and held highly successful tent meetings. Nearby, other tents rose to shelter our Smithsonian folklife festival. I went on opening day to watch some Caribbean dancers at the festival and I can report that people were just as well-behaved there as they were at the Mass and the Dalai Lama's visit and, I guess, the tent meeting, which I didn't go to since that *was* pretty far off my beat.

Also, the Archbishop of Canterbury showed up and though he held no Anglican service on the Mall he must have crossed it a few times whizzing out to the National Cathedral. As far as I know, everyone behaved properly for him, too. What's happening to us?

On the purely temporal side of life on and around the Mall, I recall the opening of the Red Room at the First Ladies display in the Museum of History and Technology. Because I am very mushy about Rosalynn Carter, I forsook deadlines, eschewed new resolutions to Work Hard at the Desk, backslid on promises quaveringly made to testy superiors and slipped into the gathering at the Museum of History and Technology to catch a glimpse of her. It was a fashionable and high-powered Washington crowd, including some Presidential connections (Mrs. Martha Custis Peter and Mrs. W. H. Harrison, for example), so I hid my deck shoes.

Mrs. Carter came along, said exactly the right things with heart-warming brevity—as she always does—and cut the ribbon that isolated the new room from the rest of the First Ladies displays.

It was Mrs. John F. Kennedy who refurnished the White House Red Room, and this is a redo of her achievement. Her Inaugural ball gown is there along with those of the four most recent First Ladies, including Mrs. Carter's. Furnishings come either from the White House or the Smithsonian, and our curator of political history, Margaret Klapthor, put them all together after careful research.

For some reason, Mrs. Carter never noticed me, so I just walked back to all those commitments.

—Edwards Park

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Letters to the Editor

Depression art

Dear Sir: Your October cover picture is grotesque and ugly—a dreary artist, a weird picture, a long-ago sad time in our nation's history. I find it impossible to display it on our magazine table; I could not look at that picture for a month!

Mrs. Richard Martin Stedman
Arlington, Virginia

Part of SMITHSONIAN's *mandate is to recall history, particularly when relevant to the present. Depressions are never pretty, but now they are important and timely enough to appear on any cover.* Ed.

Dear Sir: Joshua C. Taylor's article, "A poignant, relevant backward look at artists of the Great Depression," reminds me of my association with the WPA art program in the early days.

I was chosen, in 1933, as a professional sculptor by a committee made up of art directors, distinguished artists and art administrators. At that time my assignments were to execute sculpture for art museums, recreation parks and public institutions. Later, when we moved into the WPA program, we had to apply for relief as unemployed artists. Then the trouble really began.

Those of us who were dedicated to true American art themes were distressed to find that many others changed direction toward social protest posters or hideous, grotesque, badly constructed art. This development was created by so-called artists —self-taught or with very little art-school background. This explains why there was good and bad art.

As I look back, I realize I learned a great deal from this experience. It kept

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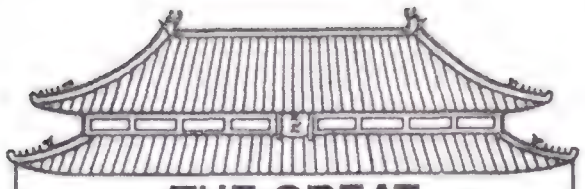

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me alive as it did my fellow artists and helped us to resume our art careers after World War II.

Frank Gasparro
Chief sculptor and engraver, U.S. Mint
Philadelphia

Dr. Taylor comments as follows: "Since the WPA was essentially a relief project, it included artists of a wide range of capacities and points of view. Of the group, many like Mr. Gasparro profited much and remained in the profession; many dropped out. But the public gained from the exposure to the highly varied arts, even finding satisfaction in such anguished expressions as that in the painting by Howard Taft Lorenz reproduced on SMITHSONIAN*'s October cover."* Ed.

Greenhouses

Dear Sir: Regarding your article on greenhouses, your readers might like to know that the creator and originator of the Climatron, as shown in your opening picture of the Missouri Botanical Garden, is Dr. Frits W. Went.

His first was a modest set of greenhouses called the Earhart Plant Research Laboratories at Cal Tech in Pasadena. But in 1949, he dedicated the first elaborate one of such greenhouse chambers, designated a Phytotron, or a building constructed so that plants would grow under very specific and extremely accurate, controlled environments, especially light, temperature and periodicity of darkness and light. These buildings sprang up all over the world following the original Phytotron in Pasadena. The two at N.C. State and Duke universities are the largest in the United States.

Dr. Went is still active in his favorite profession or "hobby" of working with plants and their environmental conditions at Reno's Desert Research Institute.

J. H. M. Henderson
Chairman, Division of Natural Sciences
Tuskegee Institute, Alabama

John Singer Sargent

Dear Sir: Maureen Green's article on John Singer Sargent brought me much pleasure. Anything about this great man is of especial interest to me because I was associated with him in 1921 and '22 as a model for the Boston Museum of Fine Arts murals as well as the panels in the Harvard Widener Library.

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When Richard Ormond's book on his great-uncle appeared, I wrote him and, at his request, brought forth a 35-page paper on Mr. Sargent as I remembered him. I understand these recollections are now on file at the National Portrait Gallery in London. I am now 82 and may well be among the last alive who knew and worked with Sargent.

I still have a study in charcoal for the lunette *Music* at the top of the rotunda of the Boston Museum of Fine Arts [see below]. For *Music,* I held a pose for an

hour and a half—not flexing a muscle.

Your fine article brought back a flood of memories and a highlight of my life.
Anton Kamp
White Plains, New York

Oil spills

Dear Sir: Regarding John Cole's article, "Scientists gauge extent of recovery after an oil spill," we would like to point out that while the chemical side of our research on oil spills was initially developed independently by Professor Dana Mayo, currently it is being carried out primarily under the direction of Professor David Page who is collaborating with Professor Mayo. We feel Professor Page should be credited with the major contributions he is making to our research.
Edward S. Gilfillan and *Dana W. Mayo*
Marine Research Laboratory
Bowdoin College
Brunswick, Maine

Penguins

Dear Sir: The splendid adaptation from Roger Tory Peterson's new book, *Penguins,* was of special interest to me. It has

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been my privilege to have visited in Antarctica at McMurdo Sound and other portions of the continent. Here we saw the Adélie penguins. We had the joy of having one of the emperor penguins with us for a couple of days. They are very curious and make excellent sidewalk superintendents in that they are very much intrigued by the various workings of Man.

One of the things which did not appear in your article but, undoubtedly, is known to Peterson is that it is very difficult to determine which is the female and which is the male penguin. Some of my colleagues stated that this is not important as long as the penguins kept the matter straight. Of course, if one really wants to know which one is the female, all you have to do is wait in the cold and see which one lays the egg.

The Reverend Dr. Russell T. Loesch
Lee, Massachusetts

Dear Sir: I think your statement that penguins' small, hard feathers shut out the cold water, "which in the Antarctic may be nearly 40 degrees C (104 degrees F) colder than the body of the bird" is confusing. Out of context, this statement is correct but, to make sense, it should have read 40 degrees C (72 degrees F).

Mel Huebel
Columbus, Texas

Mr. Huebel is correct. The point meant to be made was that the water might be 40 degrees C colder than the body of the bird or 72 degrees F colder. Ed.

'Hard' problems

Dear Sir: After reading Gina Bari Kolata's "Trial-and-error game that puzzles fast computers," I attempted to show my son how to compute the length of time the computer would take on the traveling-salesman problem for 18 cities. However, given the one million routes per second stated, 202.9 years would be required on the computer rather than the approximate 4,000 years stated. If 19 cities are used, it would require 3,854.7 years which approximate the 4,000 years. I used 365.25 days per year for my computations.

Jerry W. Wiley
Littleton, Colorado

The mathematician, who provided our examples, and other consultants were not as eagle-eyed as Mr. Wiley. He taught the correct answer to his son. Ed.

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Dear Sir: Your article on "hard" problems reaffirms my belief in the mysteriousness of existence and the universe. I believe every effort should be made to understand them, though. The fact that *some* problems are insoluble is a good, bitter tonic to relieve indigestion of the ego and intellect and aid the growth of the spirit. God, apparently, has constructed the universe in such a way that however grandly, subtly and powerfully we reach to expand our knowledge and means, faith will always be necessary.
Paul D. Kinne
Cameron, Missouri

Baroque world of Vienna

Dear Sir: In Joseph Wechsberg's article, "In the Baroque world of Vienna all are on stage," a correction should be made on the date that Archduke Franz Ferdinand and his wife were killed. It was June 28, 1914—not July.
John Scholl
New York City

Ladies astride

Dear Sir: Your article, "Aside or astride," gave me great pleasure. I learned to ride in Milan, Italy, what we called Pinerolo style in 1923. The forward seat had been adopted for jumping sidesaddle.

Our riding master was of the opinion that to learn to ride sidesaddle, it was advantageous to be proficient in riding astride; and this is the way women started in our riding academy (their families permitting). But the riding master thought it was easier for a woman to keep her seat aside over high jumps or with a difficult mount.
Herta K. Roth
New York City

Dibner Library

Dear Sir: The role that the history of the Eddystone Light played in the scientific collection of the Dibner Library recalls a sea chantey about its keeper.

The chorus ran:

"Yo, ho, ho, the wind blows free,
Oh, for a life on the rolling sea."

This was indeed rousing and the verses which follow have a somewhat naughtier tone:

My father was the keeper of the Eddystone Light/And he slept with a mer-

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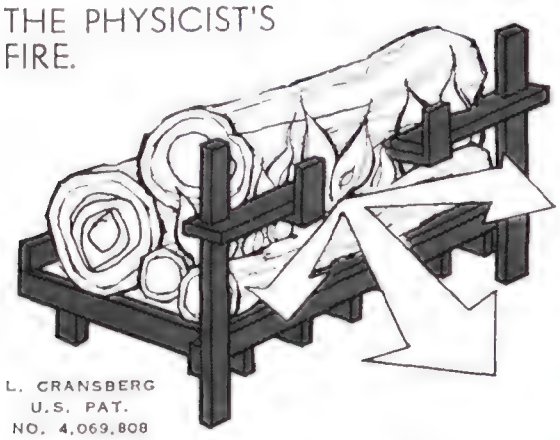

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"The Physicist's Fire . . . hot, even, slow-burning, easy to start," TIME, 12/22/75, p. 52.
"A new principle," NY TIMES, 12/29/77, C4.
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maid one fine night;/From this union there came three,/A porpoise and a porgy and the other was me.

One night when I was a-trimmin' of the glim/A-singin' a verse from the evening hymn:/A voice from the starboard shouted "Ahoy!"/ And there was my mother a-sittin' on a buoy.

"Oh, what has become of my children three?"/My mother then she asked of me;/"One was exhibited as a talking fish/ And the other was served in a chafing dish."

Then the phosphorous flashed in her seaweed hair,/I looked again, and my mother wasn't there;/A voice come a-echoin' out of the night/"To hell with the keeper of the Eddystone Light!"

Kenneth Kramer
Detroit

The view from the castle

Dear Sir: I was greatly moved by Secretary Ripley's message about the seeming decline of concern for the environment.

In Maryland our resources are varied—from the Chesapeake Bay through prime agricultural lands, to our coal deposits. There are grave questions about whether the Bay can support industrial wastes, shipping, tourism and power plant sitings and still continue to be a vast spawning ground for the shellfish and waterfowl. Can we protect our resources with the seemingly incompatible need to fuel our society? The answer must be yes!
Mona M. Smith
Frostburg, Maryland

Christmas stamp

Dear Sir: In your article in the June issue on Bradbury Thompson's new Bible, you showed his designs for Christmas stamps from 1971 through 1978. It would be very nice to see what we can expect for Christmas 1979 [see below].
Elizabeth Morris
Philadelphia

Courtesy National Gallery of Art

Stamp is a detail (Madonna) from Gerard David's *The Rest on the Flight into Egypt*. Joseph (in background) is not playing golf but knocking down chestnuts.

THE BMW 528i. A CAR THAT MEETS THE DEMANDS OF THE 80's WITHOUT VIOLATING THE CONCEPT OF A BMW.

Conventional automotive wisdom has it that any increase in a car's environmental control paraphernalia must inevitably result in a corresponding decrease in performance.

Indeed, many serious automotive writers have warned that pollution systems and fuel efficiency regulations have all but sounded the death knell for high-performance automobiles.

These gloomy predictions, however, do not take into consideration the determination of the engineers at the Bavarian Motor Works to build extraordinary automobiles.

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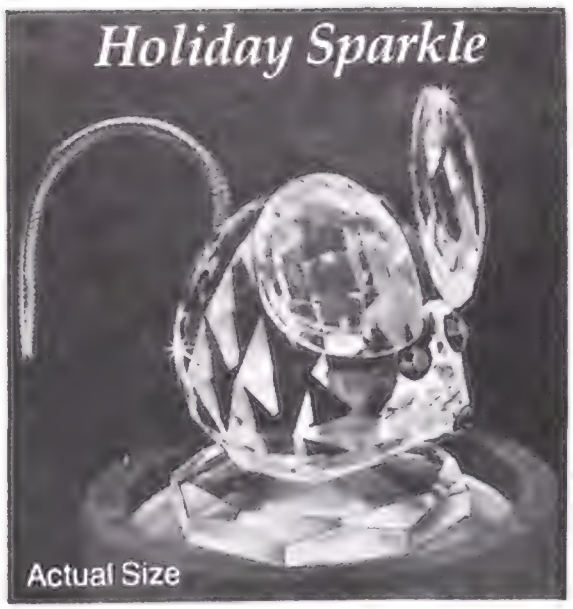

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Phenomena, comment and notes

North American cheetah, the dangers of art, counting the energy cost of food, and New Zealand rock polishers

Gems have had an irresistible attraction for humanity since whoever it may have been first found one. Puritanical types may find this part and parcel of the deadly sin of greed and abhor it, but it is human nature. And not only human nature, at least until a few centuries ago.

People in New Zealand keep turning up nicely polished "semiprecious" stones, such as jasper, agate, opal and chert, here and there in various hills and valleys. Von Däniken might explain this by saying that early argonauts of space travel arrived here with a rock tumbler of a particular sophistication and polished up a lot of New Zealand rocks, tossing out the less attractive and hot footing it back to Krypton with the really good stuff, having stopped off briefly in Egypt to build the pyramids. New Zealanders are too calm for such a notion.

Instead, according to Ian Smalley of that country, writing in *Nature* (Vol. 281, No. 5727), they attribute this miraculous occurrence to moas, large-to-huge flightless birds which became extinct soon after the arrival of the Maoris in New Zealand. The moas swallowed these pebbles and retained them in their gizzards to grind up their food, thus polishing them to a fine sheen. Some have been found associated with moa remains, but many are found alone, as far as six miles from the only source of origin.

Moas, it is surmised, picked them up at the source, wandered off and when

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they became too smooth to be of use, spat them out. Somehow these birds were able to make fairly precise "mineralogical assessments" since they chose only the hardest kinds of stones.

Let them eat protein

An argument boiled up a year ago and is back in the news with the arrival of a novel called *Cannibal.* The novel dramatizes a grisly theory that the Aztecs ate up to 250,000 people a year—an overweening ritual that arose from ecological necessity, there being not enough game animals in the central Mexican valley and grain crops not being sufficient to supply all the necessary amino acids.

The theory hasn't done a whole lot for U.S.-Mexican relations, I shouldn't imagine (it is not polite to knock Montezuma), but it has awakened the anthropological community to the subject—and it *is* a pretty exciting novel.

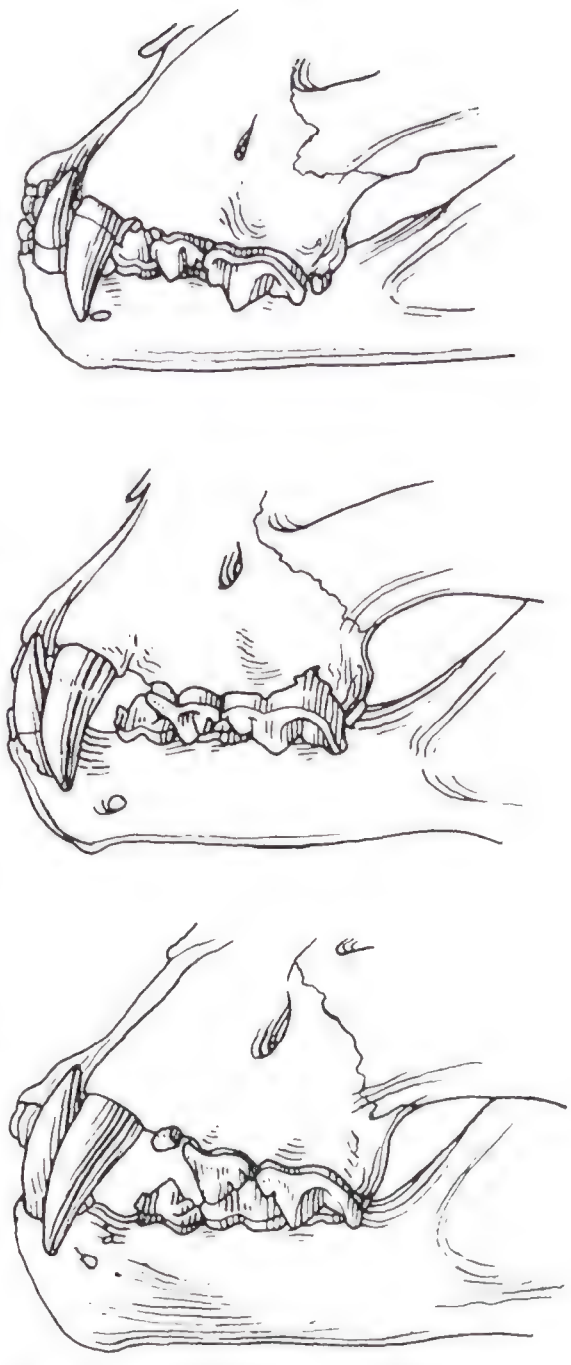
The idea has its critics, of course.

Science News (Vol. 118, No. 10) reports that a plant called amaranth was cultivated in Central and South America for 8,000 years—a major staple of the Aztec diet. High in lysine, the amino acid most difficult to supply in a diet without meat, the leaves have a mild spinachlike flavor, the seeds a nutty one. Montezuma is reputed to have received more than a quarter of a million bushels of seed a year in tribute from the 20 Aztec provinces. That seems to knock out the amino-acid deficiency business.

Anyway, Aztecs were what kids would call gross. Priests made statues of gods out of toasted amaranth seeds glued together with (bleh!) human blood and worshiped them in ceremonies. The Spaniards found such activities not in keeping with Christian standards and stamped out not only the ceremonies but also amaranth agriculture.

And *that* was a mistake which a group of nations is now trying to rectify because the plant, in its many varieties, is highly nutritious and grows extremely well in places where water is in short supply—just where much of the world's population is in the worst nutritional shape. One amaranthus plant will provide 100,000 seeds from which, they say, quite tasty flour can be made.

Maybe the Aztecs—with all of their unadmirable traits—will have taught us something after all.



Jaw of fossil American cat, center, more closely resembles cheetah, top, than puma, below. Amount of space behind the incisor teeth is the key.

A native American

The cheetah, it is agreed by all right-thinking people, is one of the most marvelous of all creatures ever alive. So delicate, so elegant, so blindingly fast—no wonder the Pharaohs wanted them as pets. Growing up during the early days of the Cold War when various nations were claiming to be the source of this or that invention, I always thought it sad that America hadn't invented the cheetah—indeed, had never had any here (except, of course, in zoos). A few years ago paleontologists found some remains in a hole in the ground in Wyoming, and said, hey, we may have had a cheetah here, or at least a cheetahlike cat. This

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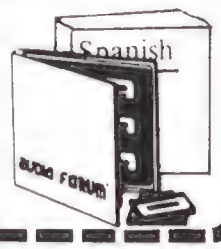

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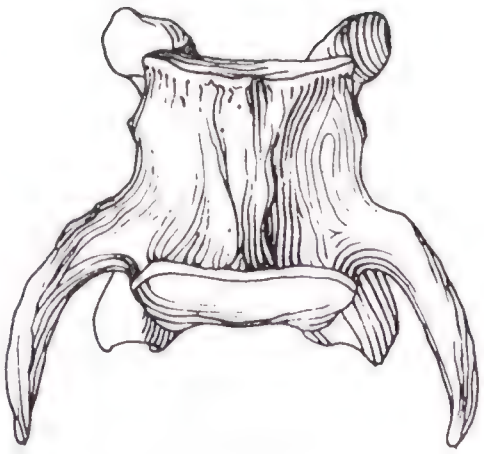

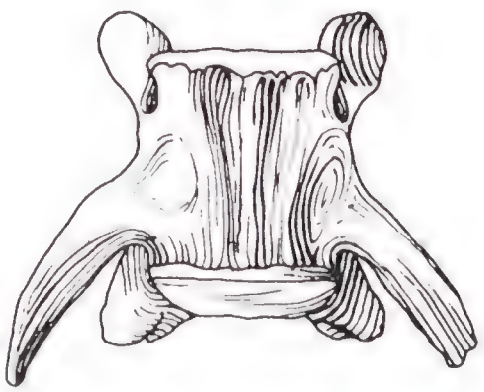

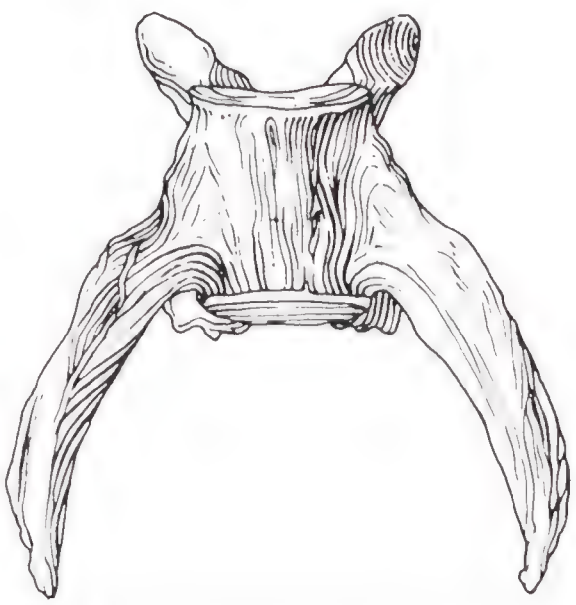

Again, the vertebra of the fossil cat at center is clearly much closer to the living cheetah's, top, than to puma's, bottom. Other evidence is strong, too.

was, with due chauvinistic pride, reported in this space (July 1977).

A considerable amount of taxonomic investigation seems to have taken place since then, the feeling being that the ancestors of our mountain lion (puma) spun off a cat which independently evolved cheetahlike characteristics while real cheetahs *(Acinonyx)* were evolving in Africa and Eurasia.

But Daniel B. Adams of the University of California at Berkeley has looked with high seriousness into a plethora of fossil material—crania, jaws, vertebrae

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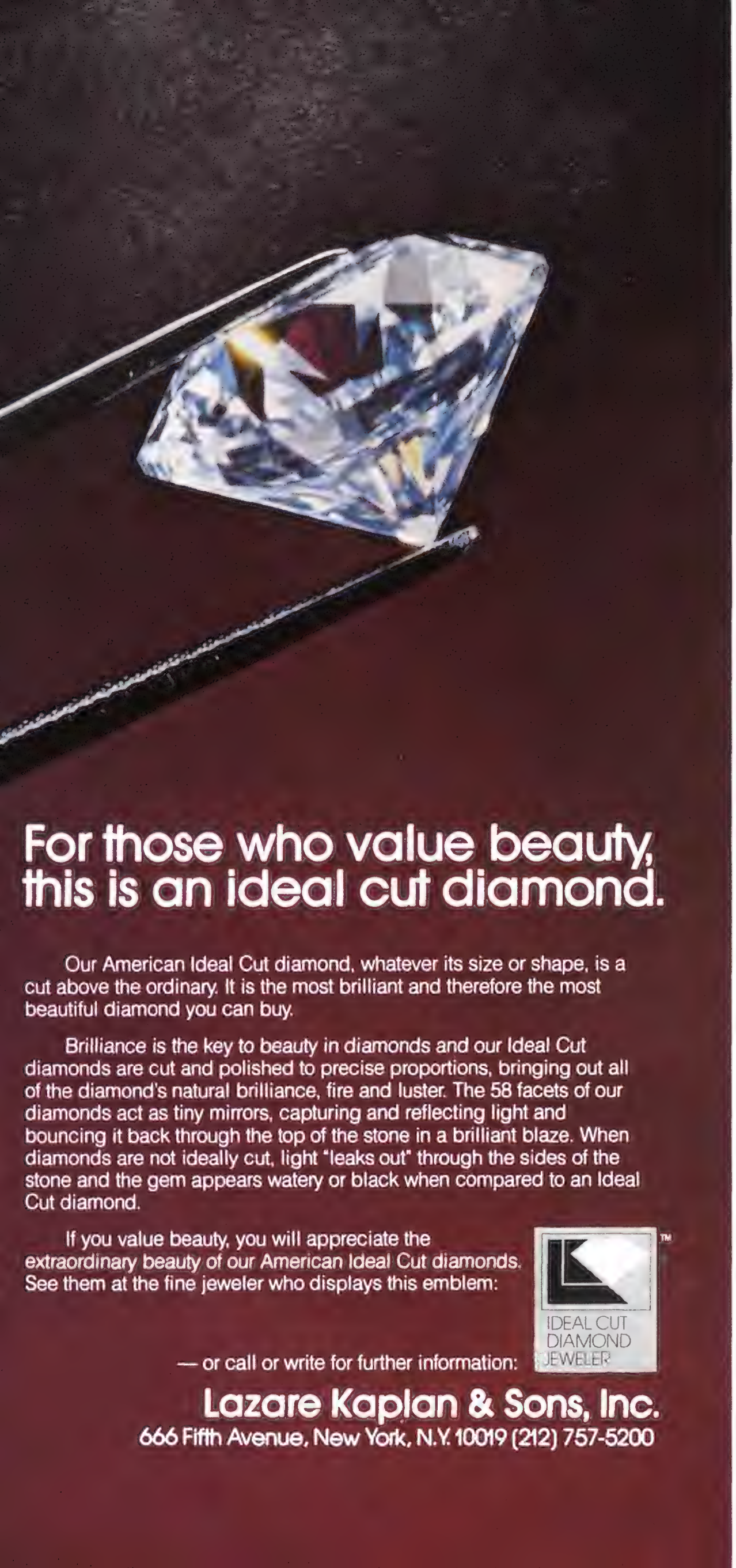
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and all—and has reached a satisfying conclusion in *Science* (Vol. 205, No. 4411). Our fossil and the Old World's *Acinonyx* are far more closely related than anyone had thought.

Vindication at last: we did invent the cheetah! But now the cheetah is an endangered species. And now Americans, who live where it was spawned, should come to its defense. At least, support your local zoo.

Cooking a cold

It says here, in *Medical World News* (Vol. 20, No. 19), that someone is doing something about the common cold and that is good tidings, it being the season of—among other things—colds.

It seems that a French Nobel Prize-winner, André Lwoff, said that heat messes up viral multiplication. Now Israeli experimenters at the Weizmann Institute and elsewhere report that they have built a device which, based on the Lwoff insight, vaporizes distilled water and, through two nozzles, shoots a hot (109.4 degrees F) airstream into the stuffy noses of patients.

"This is sufficient to dispel all symptoms of the cold in most cases," they report. Not only does the treatment relieve nasal drippiness and promote nasal dilation, but it also eliminates headaches and malaise—all of this in 85 percent of the cases treated.

American physicians have expressed cautious skepticism. Maybe the Israeli doctors' enthusiasm for their instrument induces a sense of well-being in the patient, says one. But, say I, never mind. A placebo that works, works, and I wouldn't mind having one around this winter. Nonetheless this does not, I repeat, not mean that citizens should try out their own versions. The hot-tub crowd in California shouldn't crank up the water to 109 degrees when they get a cold. It's better to sniffle than to be parboiled.

The cost of art

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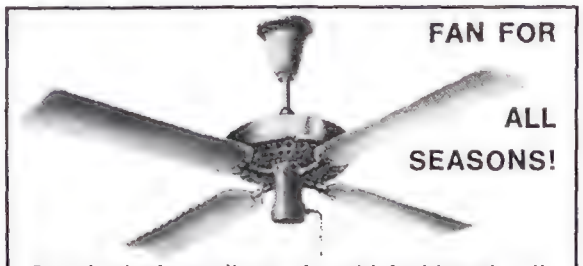

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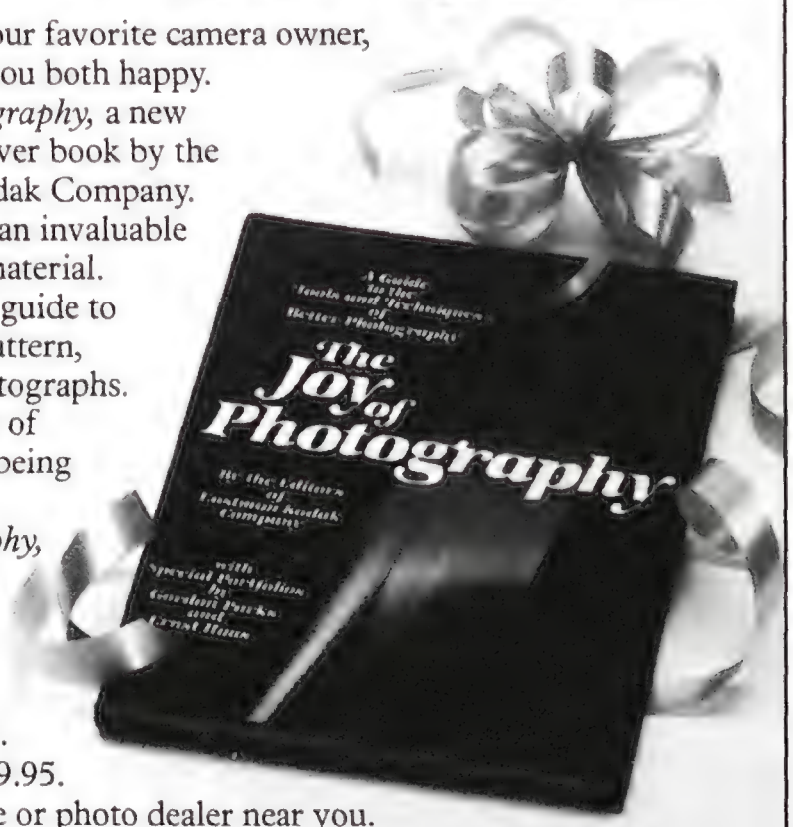

Kodak

© Eastman Kodak Company, 1979.

Take pottery. Silica, in clays, can cause irreversible lung damage (same as in mines); kilns emit noxious gases and metal fumes.

Asbestos, a most murderous substance, is found in sculpting stones and artists' talc. Solvents, such as benzene, are narcotics and worse, causing leukemia and another frequently fatal blood disease, aplastic anemia. Epoxy glues are no picnic, especially for children whose nervous systems are still developing.

What to do? Use nontoxic substitutes, says Phyllis E. Lehmann in *SciQuest* (Vol. 52, No. 7). Baby powder can replace talc in work with plastics and metal casting, for example. Clean up work areas with a damp mop or vacuum, not a broom. Use gloves. Don't eat or smoke in work area. Proper ventilation means a fan that exhausts to the outside. And if I were you, I'd check out what the practices are at your local school.

What you eat

You are what you eat, somebody said, and what Americans are is absurdly energy-intensive, as we are in most things. Just how intensive some of our food is has been calculated by nutritionists Mary Rawitscher and Jean Mayer and discussed in *Technology Review* (Vol. 81, No. 8).

About one-sixth of all U.S. energy goes into food—all the processes involved from growing it to putting it into our mouths. And some foods are scandalously overpriced energy-wise—one of the worst being feed-lot beef. For every gram of protein in a hamburger, some 850 kilocalories of energy have to be used. Compare this to chicken which, roasted, takes about 230 kilocalories per gram; tuna salad requires 170, sardines take about 70, salmon (as salad) about 93. Lobster is an energy disaster—boiled it's 800, baked stuffed, it's 970.

Much of the energy use is at home, preparing food. Eat salmon cold and save a lot of energy. Use a pressure cooker. Stay away from the oven as much as possible. Substitute—once a month—a pound of fish for a pound of beef and the annual savings would be equivalent to 117 million barrels of oil. Just by doing the above each of us could still be well fed and have saved a half a barrel of oil. Piece of cake.

—JAMES K. PAGE JR.

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By William MacLeish

Far out in the Baltimore Canyon, oil companies play for high stakes

Our continental shelf may contain the jackpot for petroleum-needy Americans, but it takes technology and lots of money to join the game

Ken Kaigler danced a little on the long afterdeck of the service boat. He was trying to keep his lizard-skin boots away from the seas sheeting in over the stern. All the day before Kaigler had sat around the general manager's office in Davisville, Rhode Island, waiting for a break in the weather big enough to get a helicopter through. No luck. Instead of the 90-minute hop, he had boarded *Biehl Trader* for a 12-hour run, out past Block Island and then south into quartering seas. *Trader* is a Cadillac of a craft, but the pitch and roll had brought uncertainty to Kaigler's stomach.

He stood brooding at a sight that would have amazed almost anyone else: thick yellow tubes of steel rising right out of the ocean toward a behemoth of a box 80 feet above. The neck of a crane showed birdlike over the edge of the one-acre deck, and a rope-and-rubber basket came twisting down through the wind to land on the fantail. Kaigler and three others tied on grimy life vests, stepped up on the rubber doughnut and shot skyward.

Thirty seconds later, the crane operator set Kaigler down smoothly on Norwegian territory, the deck of the semisubmersible drilling rig *Zapata Ugland*, anchored in 443 feet of water 100 miles due east of Atlantic City, New Jersey, over a stretch of ocean bottom known as the Baltimore Canyon.

Crossing to the crew's quarters, Kaigler headed down a long corridor, past neatly kept sleeping quarters, offices and a recreation room to a sign marked "Company Representative." He walked into the tiny cabin and grinned up at the occupant, a short, stout Texan saluting a tall, stout Oklahoman. "Greater love," he said to Don McCollough, "greater love hath no man but that he should relieve his buddy by boat." The big drilling engineer grinned back and down. Oilmen call a spell of work a tour and pronounce it "tower." Don and Ken had been alternating 14-day tours. Now, with the testing coming up, it would be seven days on, seven off. Each was on call the full time aboard, and any more duty under that kind of pressure would have been pushing luck.

McCollough chafed at the weather. He was eager to get home to his family. But he stayed to take an order for a $160 pair of cowboy boots from a big Norwegian seaman before grabbing his bags. Kaigler was now the company man, top representative on the rig for Tenneco Inc. of Houston. That meant he had hands-on responsibility for a multimillion-dollar, months-long, brain-bending, tendon-stretching effort to see if there were hydrocarbons in profitably extractable amounts somewhere under the nine square miles of sea bottom known as Block 642.

He lowered himself into the seat of authority, a swivel chair in easy reach of a computer terminal, a radio transmitter, and files of reports and printouts. He commenced to thumb, hum and grunt his way through the pages that told him what was going on beneath him in a hole inches wide and miles deep.

Ken Kaigler was involved in a gamble with stakes that make those in Atlantic City's new casinos, 100 miles across the water, look puny indeed. The name of the game is offshore drilling. With land-based oil reserves dwindling and Middle East oil rapidly growing more expensive, oil companies are looking more and

The author wrote about the relation between oceanic currents and climate in the April 1979 SMITHSONIAN.

At dusk, at the edge of the Baltimore Canyon, *Zapata Ugland* squats in 443 feet of water on Block 642. The powerful floodlights allow the crew to work around the clock and drill as much as 200 feet of hole per day.

Photographs by Marvin E. Newman

B. J. Nixon/Tenneco Inc.

Calculator at hand, Tenneco engineer Ken Kaigler pores over drilling reports in his office aboard the rig.

more to the petroleum potential of the continental shelf—off New Jersey, off New England, off Alaska. The financial risks in this kind of prospecting are staggering. The odds are about 50 to 1 against a given hole providing enough of a find to cover the bills and produce a profit. But the hit more than pays for the misses. Much more.

There are a number of junctions, critical points on the long line to an oil or gas find, and in each one the switches must be set just right. To begin with, your prospect has to have a sufficient amount of dispersed organic material—the remains of plants and animals. If the time and temperature involved in cooking the stuff are within the productive ranges, you're still in the game. If there are rock formations like sandstone, porous enough to act as reservoirs, things are looking up. If there is impermeable rock, like shale, over the reservoirs to prevent hydrocarbons from seeping to the surface, you're halfway home.

Now, if something has occurred to create a trap that will dam the hydrocarbons in their percolation—a faulting of a formation, the thrusting up of a dome—and if the entrapment occurred at the right time during the thousands of gestatory millennia, you can begin to smile. If nothing has broken the seal or trap, chances are you have oil or gas or both.

You can learn a lot about those switches through geologic know-how and good seismic work—reading echoes bouncing back from the formations. But at some point, if you want to find out what you've got, you have to bet on a pants-seat hunch. You have to hire yourself a rig and a Ken Kaigler and go out and drill.

Satisfied with his self-briefing, Kaigler got on the radio to his boss, Hugh Horton, general manager of the Tenneco venture. They talked with the concern of surgeons about completing the hole to its targeted depth of 18,400 feet.

It was time to see how his contractors and subcontractors were doing, the multinational jumble of specialists characteristic of oil operations. The rig is owned by Norway's shipbuilding Ugland family. It is operated under long-term lease by Zapata Corp., a Houston-based drilling contractor and holder of a two-well contract with Tenneco. A flock of other outfits roosted on the rig—divers, testers, drilling specialists.

Out in the day, now bright and brilliant, Kaigler, the little Texan, moseyed past drilling pipe racked

Zapata Corp.

Up on its pontoons, *Zapata Ugland* can plow along at a speed of nine knots—if the wind is right.

View from *Zapata Ugland*'s 200-foot derrick toward a deck almost the size of a city block. At the top is a pad for helicopters. The wheelhouse, the command center when the rig is under way, is at upper right.

high on the vast deck. The derrick drew the eye, thrusting from the raised drilling floor. Some 300 feet from the top to the sea. Eiffel afloat. The twin pontoons, each longer than a soccer field, rode deep in the water, their ballast tanks full, to dampen the surges. All this is to keep downhole work on schedule, close as possible to the $12 million Tenneco had budgeted for the drilling and testing. There had been a winter day, the well half-drilled, when 40-foot waves and 70-knot winds had shut down operations on the handful of other rigs in the area. But not the *Zapata Ugland*. She was built for the North Sea, home of foul weather. She can work in seas up to 50 feet and remain anchored until they reach 100.

Kaigler took a detour below deck to the mudroom, the source of the sharp-sweet smell that pervaded the rig. The drilling fluid swirled in its mixing tanks, a cocktail of refined clays and chemicals whose composition could be changed almost instantly to meet shifting conditions. Piped down the hole, the mud could be used to increase or decrease pressure, to cool and lubricate machinery, even to coat delicate formations whose exposed surfaces at the wellbore needed protection. The whole operation was tied into computers and run by a geologist with a quarter of a century in mud. He had seen or heard of it all—walnut hulls, chicken feathers, telephone poles, you name it—put down the well in the name of control.

Back up on deck to talk to people from a firm called Johnston-Schlumberger, which handled many of the testing functions. A stop at a computer-filled van run by well-monitoring people calling themselves simply The Analysts. Working with geologists and other specialists, they were keeping series of logs showing various properties of the formations drilled through.

Then up the steep flights of steel stairs to the drilling floor, a boxy nave of a place under the great spire of the derrick. The floor pulsed as the rotary table spun, about 120 revolutions per minute at its center. In the jaws of the rotary turned the kelly, more than 50 feet of hexagonal, hollow tubing screwed to the top of thousands of feet of pipe—the drill string—and powering the rolling fists of the drill bit as their tungsten knuckles crushed the rock below.

The tool pusher, the shift boss, came over to fill Kaigler in. He was young and Australian and carried

the catchy name of Blue Rapley. Over in a corner, the driller stood in his glassed cab, a Scot with a yell on him like the noon whistle. One hand on the brake lever controlling the drawworks, the winch and cable that held the half-million pounds of metal turning in the hole. One eye on the gauges that gave him his drilling speed, mud-pump pressures, the weight on the bit—40,000 pounds. Across the deck, "roughnecks," the men tending the drill string, watched as the kelly spun. The roughnecks were young, all of them. Their fitness gave them a look of innocence.

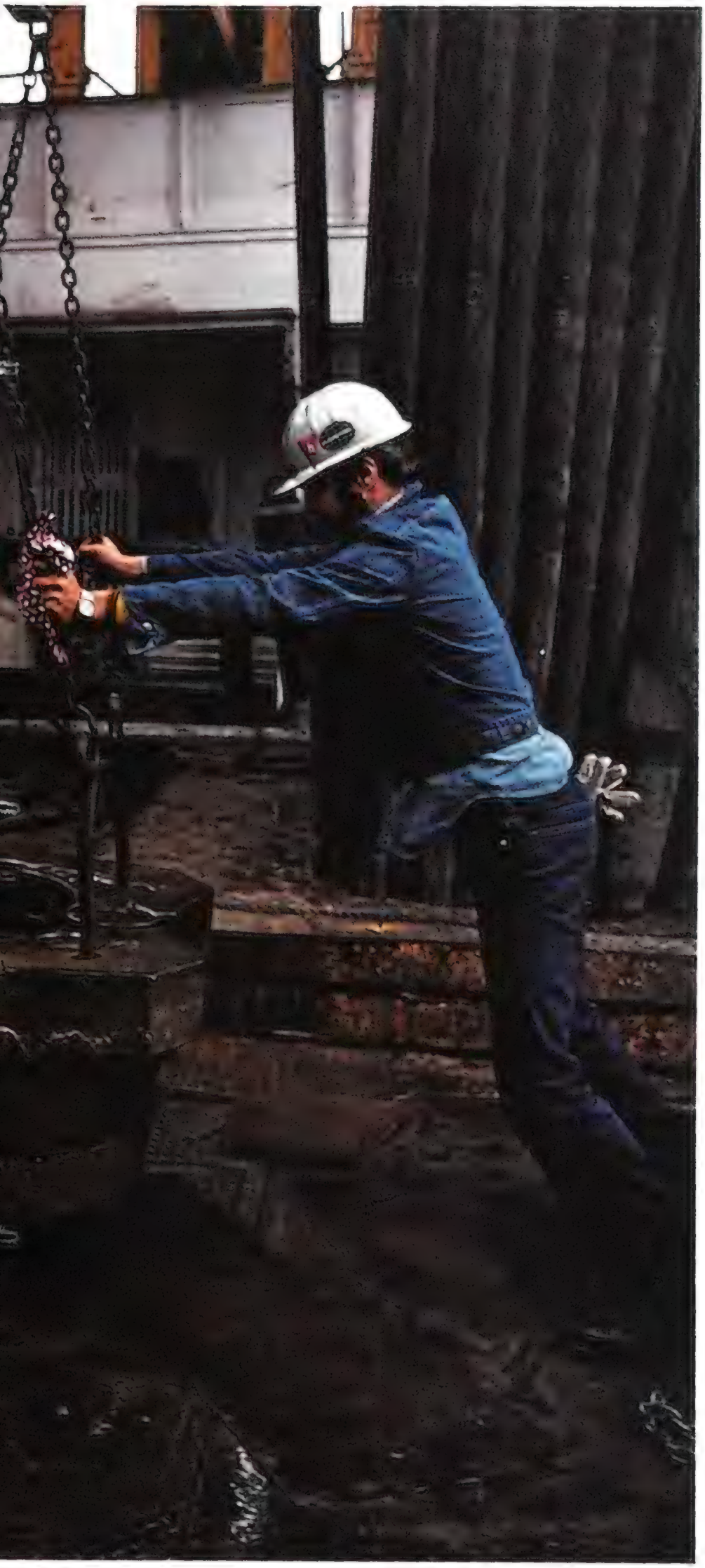
The caterers were ready with the noon meal in the mess on the lower deck of the crew's quarters. Men just off their 12-hour tour came steaming from the showers, unrecognizable in their cleanliness. Babel sounded. The overworked vowels of the all-Norwegian marine crew clashed with the accents of Scotland, Australia, Wales, Canada, the slurs and twangs of the Sun Belt. There were 80 men aboard, no women.

They ate hugely, concentrating on what was in front of them. "A man," said a sedentary supervisor, eyeing his paunch, "has to watch what he eats out here or he's gonna look like a wine barrel with the staves kicked out." From others came a sense of what it is that brings them to the rig and keeps them there, celibate, boozeless, limited in entertainment to books, TV, movies and their own devices.

The pay is good: one year on the *Zapata Ugland* brings the roustabouts, the beginners, about $18,000. Their year, split into three weeks on, three weeks off, really comes to about six months of hard labor; the rest is free time. Free transportation home and back between stints. Free room and board. And even the odd schedule attracts some. "When I come home to my woman," said a tall, bald Canadian, "it's like starting all over again. We both like it this way."

Deeper down, accepted and seldom talked about, is

On the drilling floor, "roughnecks" wrestle with apparatus before sending test tubing down the well. It



will take almost 12 hours of work and some 13,500 feet of pipe and tubing to reach testing depth.

the sense of being a part of risk, of mixing muscles with sophisticated and dangerous machines, of chancing a mashed hand or worse to be in on the big find. "Wildcatters," said a Tenneco front-office man on board for the day, "do it for the thrill."

That seems true all the way to the top. If there is anything monolithic about big oil, it is The Gamble. The nation's most ardent oddsmakers are in Houston, not Reno. Today the wildcatter's game is opening the Atlantic frontier.

Phil Oxley is a player respected at any table. He is a geologist, a former teacher of geology, who jokes about having sold his soul to industry. He has done well in the bargain, is now senior vice president for exploration of Tenneco Oil Co., a subsidiary of Tenneco Inc. A tall man, brown eyes clear behind half-glasses, Oxley leaned a little on his pedagogical talent as he talked about how his company had joined the betting on Baltimore Canyon. "A lot of us wanted to believe that we could find gas or oil off the Atlantic Coast," said Oxley, "near such a lovely market. Some companies that went all out in the Baltimore Canyon were just starved for domestic reserves."

"It's like a game of Battleship"

In 1975 the Department of the Interior, which handles such matters, decided to initiate the complex ritual dance that would lead to actual exploration of the Baltimore Canyon area: lease sale number 40. The United States Geological Survey (SMITHSONIAN, March 1979) ran an environmental impact study. Maps were prepared of the region's outer continental shelf. Each map was divided into numbered 5,700-acre blocks, chips in the poker game. The companies retired to their headquarters, pulled the shades, and planned their plays. Those opposed to the sale on environmental, economic or political grounds did the same. Months of litigation followed. Then, late one August day in 1976, a crowd of oilmen, their supporters and their opponents, all gathered in the ballroom of New York's Statler Hilton hotel, got word that the sale could proceed. More than 400 bids were submitted. The winners received five-year drilling rights to 93 tracts. They had paid the federal government a record $1.1 billion for the privilege.

"It's like a game of Battleship," Oxley said. "You're trying to figure out if the treasure lies all under one block or under a string of them." The most promising structure, at least the most popular, was a huge bulge in the rock near the landward flank of the 300-mile-long Baltimore Canyon area—the Great Stone Dome. The giants were interested in that, and bids were likely to be high.

There was a strong argument in Oxley's shop that

things would go better farther out to sea. That was where Block 642 was, about 20 miles east of the Dome. Tenneco looked at the block just north, 598, liked it but figured it would go for more than the company wanted to pay. With a partner, Tenneco put in a bid of $8,190,000 for 642.

As always in these sales, insiders like to look at the difference between the top bid and the runner-up. They call it money left on the table. It's an estimate of how much you lose by winning, of how different gamblers read their hands. Tenneco left some $6 million on the table for 642. "We were a little amazed we were so far out of line," said Oxley. "But it was a bargain, compared to many blocks on the Dome." It was. Over there, one block had gone for $107 million.

Tenneco joined its colleagues on the long and costly trail of the permit seeker. An exhaustive environmental impact statement had to be prepared for each block. The Environmental Protection Agency looked at what Tenneco was going to do to keep pollutants out of the sea. (From 642 the garbage was going to be hauled to a landfill in Rhode Island.) The USGS looked at the company's procedures for handling blowouts and other emergencies. Governments of affected states took their turn at review. Finally, after more than 18 months of regulatory work and legal maneuvering, it came time to drill.

The oil companies made more than a dozen holes in the first flush, many on the Dome, a few on some blocks there in which Tenneco had an interest. All were dry but one. And that one, gas, was on Block 598, right next to 642.

Texaco, with five partners, held the lease on 598, and announced their find significant but not commercially producible. A frontier find has to be big to be profitable. Everything must start from scratch. Tens of

Down goes the testing string, supported by a winch and cables that can hold 500,000 pounds.

Huge yellow traveling block above deck raises or lowers the drilling and testing strings.

millions of dollars must go into designing and building the production platforms. Then there is pipeline. Down in the Gulf there is so much that they call a stretch of bottom near the Houston Ship Channel the "spaghetti bowl". Here there is nothing. All told, it might take almost a billion dollars to connect Baltimore Canyon gas with consumers.

It was still, as a distinguished president of Yale used to say, better than a slap in the belly with a wet fish. Tenneco sent word for the *Zapata Ugland* to come across the pond and drill 642. She can make more than nine knots steaming under her own power, more when the wind is astern of the towering derrick. But the wind was from the west, and the rig stayed within sight of the Azores for almost a week. The trip took 45 days.

To expedite drilling and save costs, Tenneco and its neighbors got neighborly. Texaco agreed to drill inside 642's northern line with Tenneco sharing expenses and geological data. Giant Exxon agreed to pay half of the *Zapata Ugland*'s drilling costs in exchange for geologic information.

The *Zapata Ugland* spudded-in in January this year. One hundred and eighteen drilling days later—two short of budgeted time—the well reached its target depth. It was cased to 13,700 feet with pipe designed to protect both the hole and the formations it had pierced. Now for the test.

Big Don McCollough was the company man aboard. The test would be along a 30-foot section 13,500 feet down. Don went up to the drill floor to watch them run the testing tool down the hole at the end of its tubing. Stands of the tubing about 100 feet long were stacked vertically in one corner of the derrick, racketing in the wind. At their top, a man rode a racker arm out into space, guiding them one by one out to where he could clip them into clamps hanging from a

Beneath deck lies the "moonpool," open shaft through which the well casing thrusts into the sea. Cables control a blowout preventer and other devices below.

Hanging on a pipe, a technician from Johnston-Schlumberger prepares the testing equipment.

huge steel hook. Below him, roughnecks attached each stand to the tubing already in the well. Down went the hook, up again for a new stand. And again and again, the teamwork never faltering. They had been going like this for almost 12 hours, and the testing tool was about where it should be in the wellbore.

The casing at the selected depth had been perforated by a multiple-shot shaped-charge device. Now a rubber bushing on the testing tool bulged out, sealing off the top of the zone. Everything was ready.

The Johnston-Schlumberger employees swarmed around the rotary, natty in their blue coveralls. They attached an array of piping and gauges straight out of Smokey Stover. With infinite care, pumps applied pressure to the drilling fluid, the all-essential mud. The Johnston-Schlumberger people peered at their instruments; one stuck a tiny plastic tube in a bucket of water and watched for air bubbles.

Pressure built up. Something was forcing the cushion of seawater in the tubing up and out. Valves were thrown, diverting the flow to heaters and separators on the main deck, and from there to a long outboard boom. A specialist touched off the pilot light at the end of it. Orange and black, flame and smoke bannered out over the ocean. Men felt the heat at the opposite end of the deck and whooped.

This wasn't Clark Gable standing heroic, grinning skyward while a gusher fountained oil on his face. This was a high-rolling, high-technology, high-cost cigarette lighter out there, and it was something to see.

It was all over the network news that night. The next morning, Ken Kaigler landed on the copter pad with a newspaper under his arm: "Tenneco strikes gas off coast. Second Baltimore Canyon find revives hopes of discovering major deposit in area." Everyone did a lot of grinning that day.

Tenneco kept testing, coming up with gas a little higher up the hole and with gas and some oil at about 8,000 feet. Ashore, or in the Gulf, both the Tenneco and Texaco finds would probably have been regarded as commercial. But there still wasn't enough evidence that the requisite amount of gas was down there. Tenneco had two choices. It could hold the *Zapata Ugland* on standby while waiting to see what Texaco and Exxon discovered on neighboring blocks; that meant paying Zapata about $20,000 a day, probably for months. Or it could drill on another block and come back if yet another well made sense.

The decision was to move the *Zapata Ugland*. There was some ribbing aboard. "That's one reason why geologists don't like drillers," drawled a crewman. "Drillers are forever making hole down to good prospects and killing them."

The big anchors were broken loose by the service boat and winched in. *Zapata Ugland* rose almost 60 feet as the ballast tanks emptied. The Norwegians took over, bringing their monstrous vessel onto a southerly course. The rig headed for Block 495, leased by Tenneco in the area's second sale—a lackluster affair held early this year, that netted a mere $41 million.

In October, after 120 days of drilling, 495 turned up a dry hole. But later in the month Texaco, in its own well on 642, struck gas again—in modest quantities. Tenneco sat back to reevaluate its cards. To many, the Baltimore Canyon trough had come to look like one long shot. Better explore elsewhere for new finds, they said, in the Arctic, the vicious seas off Alaska. Not Phil Oxley. "The conventional wisdom is that the trough has been a disappointment," he said. "But there's still a lot of area to be explored. You never know when these things are going to turn around. They drilled, I don't know, 40 years in Alaska before they found what was in Prudhoe Bay. They sank 50 wells in the North Sea before the Ekofisk discovery."

The cost of doing business offshore is rising. The well at 642 was perhaps five times more expensive than a comparable land well. Figures will soar with the investment in new technology needed to produce in really deep water and with the environmental regulations that are sure to come in the wake of the huge Ixtoc I oil spill off Yucatán earlier this year.

Could there be enough oil and gas out there to cover costs and gladden stockholders?

"Conceivably, there could be a major source of hydrocarbons," said Oxley the geologist.

Said Oxley the gambler: "It's at least possible."

A test is a success on Block 642—natural gas flames out from end of *Zapata Ugland*'s boom. But whether gas exists in commercial quantity remains to be seen.

Reuben R. Baker jr.

Article and photographs by Vic Banks

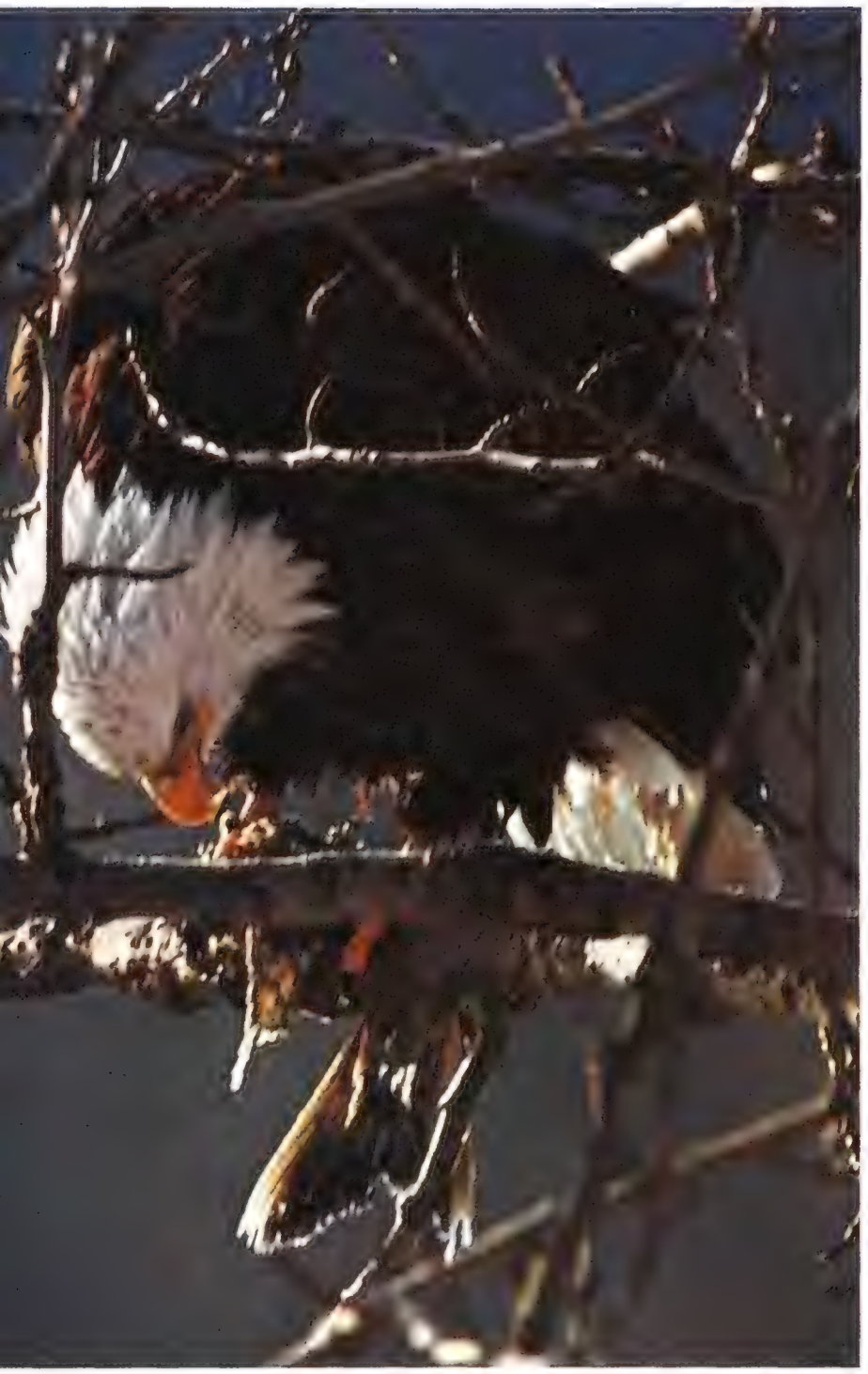
Bald eagles flock in cottonwoods on Alaskan river

When salmon run up the Chilkat in late fall the birds drop territoriality, feast together and look hardly at all like a vanishing species

Dick Folta's station wagon slides along ice-glazed Haines Highway, parallel to southeast Alaska's Chilkat River. On the frozen river a coyote watches our approach, then lopes off into the blinding morning light. At the 19-mile post, two enormous bald eagles perched on bony cottonwood branches stare down at us. As we round a sharp bend, Folta slams on the brakes. Not more than 50 yards in front of us at least 70 bald eagles perch in the trees (above). In fact, they're everywhere.

Three or four circle majestically in mountain updrafts 8,000 feet up; still more waddle on the snowy river bank. On the far side of the river are several hundred more; by day's end we have counted 1,800 bald eagles gathered along less than three miles of river. This stretch of the Chilkat, referred to locally as the "eagle counciling grounds," attracts thousands of bald eagles to feed on the tons of salmon found here, making it the greatest known concentration of our national bird anywhere.

Where bald eagles flock like starlings



Balanced on its perch, an eagle tears into chunk of salmon. The species often does its hunting from trees.

Unfortunately for the salmon and birds, the Chilkat borders lands that contain low-grade iron-ore deposits rich enough to have led multinational corporations to explore the possibility of an extensive open-pit iron-ore mine. Large-scale lumbering is scheduled to resume in the valley in the near future. And other seemingly unrelated economic developments are coming to bear on the eagle lands; some argue that all this could destroy a rare international treasure.

The Chilkat flows about 100 float-plane miles north of Juneau, where Alaska's panhandle joins the interior. Mountain ranges on both sides of the river form an icy corridor drawing the interior's bone-cracking winter down to the sea. It is one of Alaska's most productive rivers, yielding nearly 500,000 salmon annually. Each spring and summer, sockeye and prized king salmon, as well as large runs of a species of smelt called hooligans, return from the sea to spawn, providing sumptuous food for animal and man. In early fall, perhaps 30,000 silver or coho salmon return to spawn. In warm months the region is bountiful but, when cold weather sets in, fish stocks dwindle, forcing most of the predators depending on spawning runs to disperse.

But the Chilkat provides a life-saving dividend: beginning in late August and continuing for two to four months, while near-zero temperatures freeze the water, better than 200,000 chum salmon swim upstream and spawn in one of Alaska's unique late-fall runs. (They are known locally as dog salmon, perhaps because of the males' overlapping teeth or because Alaskan natives did not like them and fed them to their sled dogs.) These 7- to 12-pound fish are attracted to the ancient spawning grounds because certain stretches of water near Klukwan Village remain ice free.

Once the salmon die, they decompose slowly in the frigid waters, supplying precious food for eagles at a time when winter hunger can kill. Even so, some eagles don't make it.

The ice-covered mountains bordering the Chilkat may not stay pristine long. Dick Folta, a Haines lawyer, explained: "You're looking at a range that's nearly all low-grade iron ore. And a good part of the valley is made up of rock that's eroded off the mountains." Over the last 20 years, corporations including U.S. Steel and Mitsubishi have spent several million dollars testing the ore deposits and renting leases. No actual mining has begun, but changes in the world market for iron ore could alter the situation in a hurry.

The iron ore is just one potential conflict for the eagles. Area residents want jobs, and so far lumbering offers the best prospects. The state has designated

Vic Banks, a Chicago-based free-lance writer, specializes in wildlife and environmental subjects. He also designs natural history exhibits.

4,800 acres along the river as a critical habitat area for the eagles, but some biologists say the eagles use a lot more of the woods and might be driven off by timber operations.

The issue is a classic in conservation, perhaps best expressed by Joe Hotch, a past president of Chilkat Indian Village council: "There's a lot of worry about the eagles, but not too much worry about the people."

There the matter rests—and the eagles feed. Folta and I went out to document the eagles, weather permitting. Low dark clouds moved swiftly, hiding the mountains in gray fleece. It began to snow. That afternoon the weather broke, pouring warm yellow light across the frozen valley.

We went up to 20-mile, where the fresh snow covered everything. The cottonwoods lining both sides of the river were flocked like Christmas trees—with eagles ornamenting every branch. For the eagles these trees are chairs at the banquet. Unlike their more aggressive relative, the golden eagle that hunts on the wing, these birds more often sight prospective food from fixed vantage points. In the trees we saw salmon heads, tails and meaty chunks being eaten.

Hungry eagles forgo territoriality

During the winter months, when the territoriality of the eagles' reproductive cycle is diminished, the birds draw closer together. This tendency is increased when there is an abundance of food, sometimes with antic results. In the river, we saw a scene more like the Antarctic than southern Alaska; an ice floe packed 20 to 30 birds deep—adults with familiar white head and tail, young ones with mottled brown-and-white feathers—clustered at the water's edge looking more like penguins than eagles.

A short distance away a young eagle dragged a partially eaten salmon carcass out of the water. Gripping the nearly frozen fish awkwardly, the bird tore off pieces of meat with a force that threw it back several feet in the snow each time. Composing itself, the bird cautiously eyed the other eagles, then lifted its head up and finished the meat. A magpie and gull landed on the dead fish and began eating. As the eagle waddled back for more food, the two stepped gingerly aside, stopping just two feet away. Again the eagle fell back with a huge piece, and again the two smaller birds returned to the carcass. This dance for dinner was repeated until the eagle was so gorged that despite labored beats of its four-foot wings, it couldn't take off.

While watching the eagles we met Stephen Waste, a young biologist from the Wilderness Research Institute of Arcata, California, who with three other volunteer researchers has been studying the eagles in the Chilkat Valley.

An impossible sight in most of the United States, a multiple image of our national emblem takes its ease.

"To date no one has done any hard-nosed research on the Chilkat phenomenon," Waste said. He argues that it is just as important to protect the eagles' winter habitats as it is to protect their nesting habitats.

Actually the National Audubon Society, working with state and federal agencies, began a four-year study of the site last May. According to David Cline, the society's Alaska representative, "Authorities need to know more about this particular gathering of bald eagles—specifically, the daily and seasonal use of habitat—before recommending what additional measures to take for the birds' protection."

The Alaska Commissioner of Natural Resources has suggested that one potential local industry is the eagles themselves. "It has to be one of the most spectacular wildlife phenomena in the world," he said. Two years ago the state offered to create a park along that section of the river. "We went up to Haines with a presentation including a nice booklet," admits Robert LeResche, "but the people screamed out against it like gut-shot rhinos."

The future is unclear. In the meantime, thousands of the big birds return each winter when the dog salmon make their run up the Chilkat. Bald eagles dot the trees and crowd the banks, gorging themselves and creating an astounding spectacle.

An immature eagle returns for more of a salmon lying in the icy waters of the Chilkat. The gull waits, knowing that when the eagle is gorged it will have its turn. While the fish last, there is plenty for all.

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By James M. Goode

Vanished Washington and its 'capital losses'

Trolley cars round Constitution Avenue corner at Baltimore and Potomac station, now site of National Gallery.

Along with architectural monstrosities, this overplanned city has destroyed too many of its priceless historical gems

This article is adapted from the author's new book, Capital Losses. *He is curator of the Smithsonian Institution's castle headquarters.*

Give or take a few dozen torn-up blocks for subway construction, plus a few dozen developers' dreams materializing as office-building monoliths in brick and concrete and glass, the nation's capital seems a changeless, permanent place. The White House and the Capitol with its houses of Congress, the Mall and the Monument, the museums, the memorials to Jefferson and Lincoln, all give Washington a look of timeless indestructibility, as though it were built to stay.

Not so. Ever since the French engineer Pierre

Spires, high-pitched gables, elaborately patterned polychrome slates crowned the library of the Soldiers' Home, a bizarre but beautiful specimen of "stick style," torn down after only 33 years.

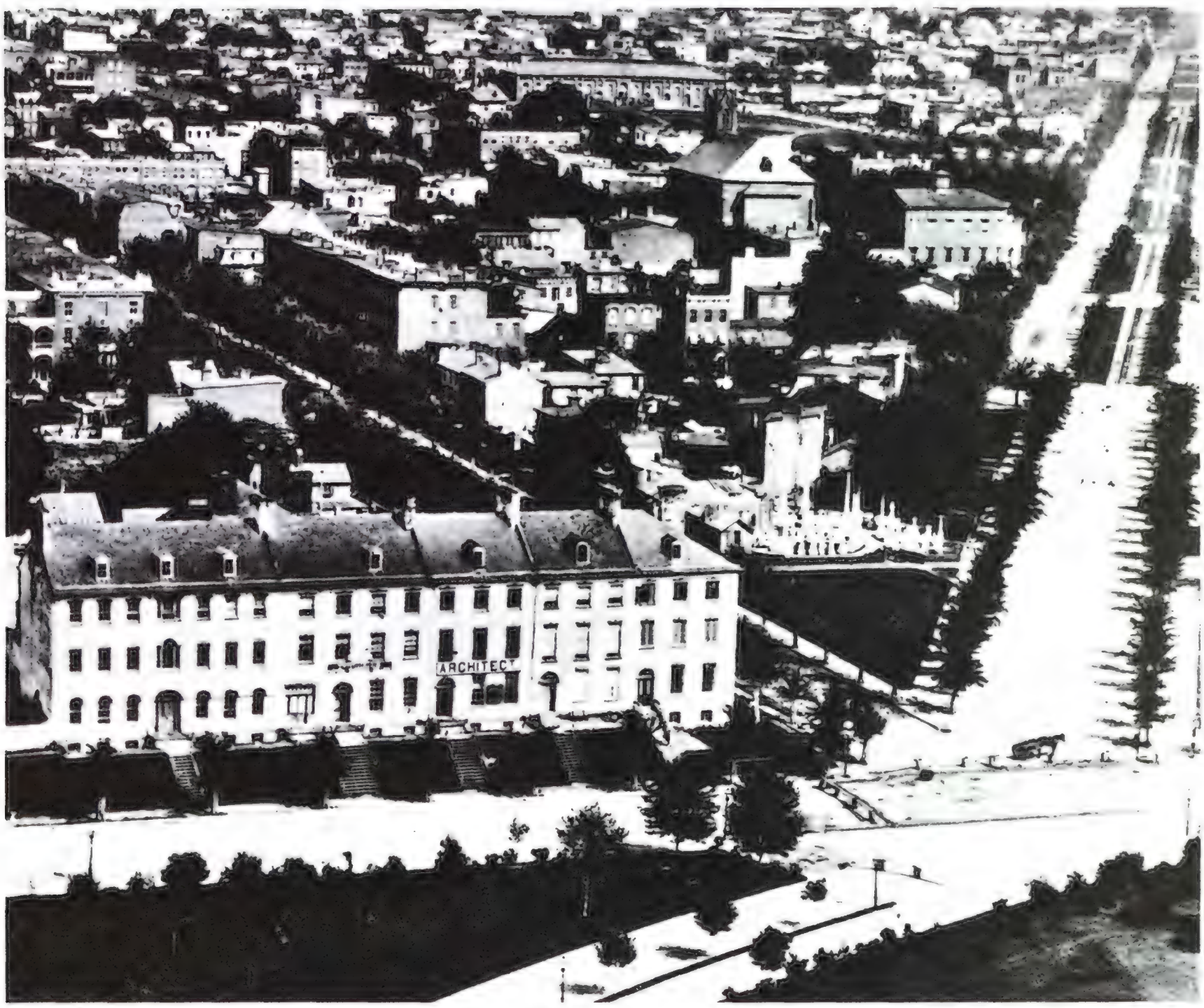
Charles L'Enfant laid out its grid of streets and broad diagonal avenues in 1791, the city has been changing its mind about how it is supposed to look. It has gone through five master plans while busily building itself up and tearing itself down. Along the way it has razed a great deal of architecture, getting rid of some ill-conceived monstrosities but rubbing out more eminently preservable gems as well.

One gem that had to go because it stood in the way of progress was the Baltimore and Potomac Railroad Station (opposite page). An outstanding example of the use of Victorian Gothic motifs, it graced the Constitution Avenue site now occupied by the National Gallery of Art, West Building. But in back of the handsome structure a train shed stretched halfway across the Mall, and piles of coal for the engines were a municipal eyesore.

In its brief lifetime (1873-1907) the "B & P" saw tragic history made. In its main lobby President James A. Garfield, in office only four months, was fatally shot

by an assassin on July 2, 1881. Wreckers demolished the station itself when the city's new Union Station, designed by Daniel H. Burnham, was opened.

Delightful but impractical—because too costly to maintain—was the library of the U.S. Soldiers' Home (p. 59), Washington's most exuberant example of the American "stick style" that featured lots of wood fashioned in jagged, angular elements. The architects Smithmeyer & Pelz, well known for the present Library of Congress Main Building, designed the "pleasure dome" in 1877 for use as an officers' billiard room and bowling alley. In midconstruction it was converted from officers' clubhouse to a library for enlisted men. But at age 33 it was razed: too expensive in terms of yearly painting and repair of the myriad wooden



Carroll Row of five Federal houses was razed in 1887, replaced by Library of Congress. At right, aimed toward the Anacostia River, is Pennsylvania Avenue.

A tombstone-cutter's yard occupies base of the "V" to right of the row houses; at top of picture is long Eastern Market building, which still stands.

Official registry as an historic building did not save the Army Medical Museum from being torn down for the Hirshhorn Museum and Sculpture Garden. Arts and Industries Building of Smithsonian is beyond it at left. Not the building, it was ruled, but its contents, including a general's leg, made it historic.

gables, porches and spires. Thus the city lost one of its most romantic and picturesque buildings, and the soldiers their favorite place for rocking chairs on spacious and breezy verandas.

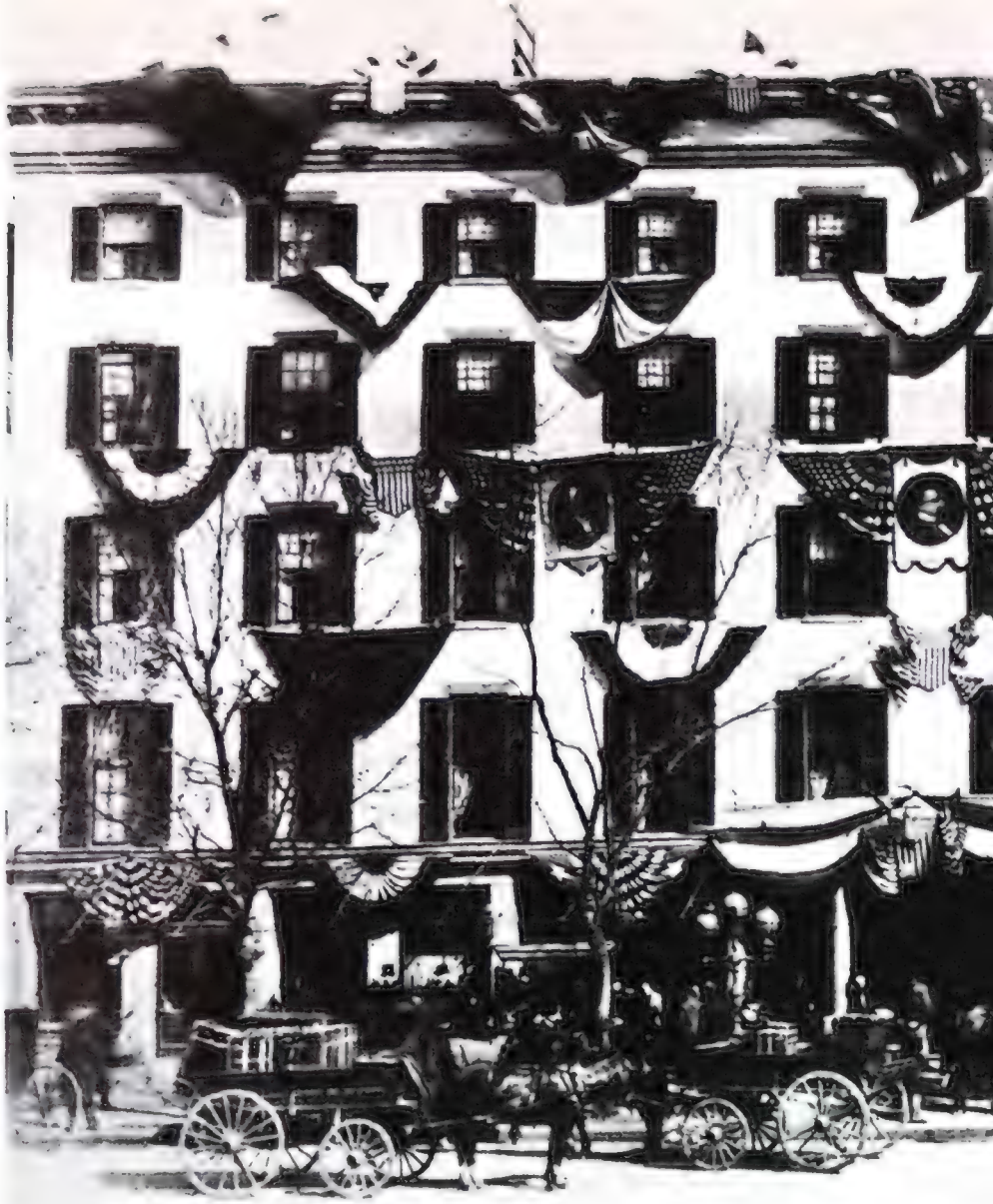
Almost all of the Federal houses on Capitol Hill have been replaced by government buildings surrounding the U.S. Capitol. Among the first to go was Carroll Row (opposite), a stately block of five houses pulled down in 1887 to make way for the Library of Congress. Built some 90 years earlier by Daniel Carroll of Duddington, the Hill's principal landowner, it was the scene of many festive occasions in its time, including President Madison's Inaugural ball in 1809, the city's first. (The several 18th-century Daniel Carrolls in the Washington area used their estate names to identify themselves.) Later Carroll Row became famous for its fashionable boarding houses or "messes" for members of Congress; patrons included John Quincy Adams and Abraham Lincoln. In 1814, when the Capitol and several other government buildings were burned during the invasion, the south, or right, house became a hospital for wounded British soldiers.

In the year when Carroll Row went down, the Army Medical Museum (above, being razed in 1969) went up, a mile to the west on the Mall. A "modernized" Romanesque Revival building of brick, designed by Adolph Cluss, it lasted until Smithsonian officials, at the personal urging of President Lyndon B. Johnson, accepted the site for the new Hirshhorn Museum and Sculpture Garden. (A condition of the Hirshhorn gift was that the collection be located on the Mall, where space was running out.)

The Medical Museum had been listed on the National Register of Historic Buildings, but the Interior Department redefined its status on the grounds that the medical specimens and a 300,000-volume library inside, not the building itself, constituted its importance and they could be moved to Walter Reed Army Medical Center.

Important or not, the exhibits were popular—and bizarre. They included the world's largest collection of antique microscopes, amassed by Dr. John Shaw Billings, creator of Johns Hopkins Hospital and the museum's fourth curator (1883-93). On the macabre side they included the bullet, probe and fragments of bone from President Lincoln's skull wound, President Garfield's bullet-pierced vertebrae, and formaldehyde-filled jars containing fetal abnormalities. A notable exhibit was the leg of General Daniel E. Sickles, struck by a cannonball and amputated during the Civil War.

Richly embellished neoclassical summer house, and a twin structure, were focal points in formal gardens maintained on Mall by Agriculture Department.



Decorated for Grover Cleveland's second Inaugural in 1893, the Willard Hotel bore his likeness on third floor above its Pennsylvania Avenue entrance.

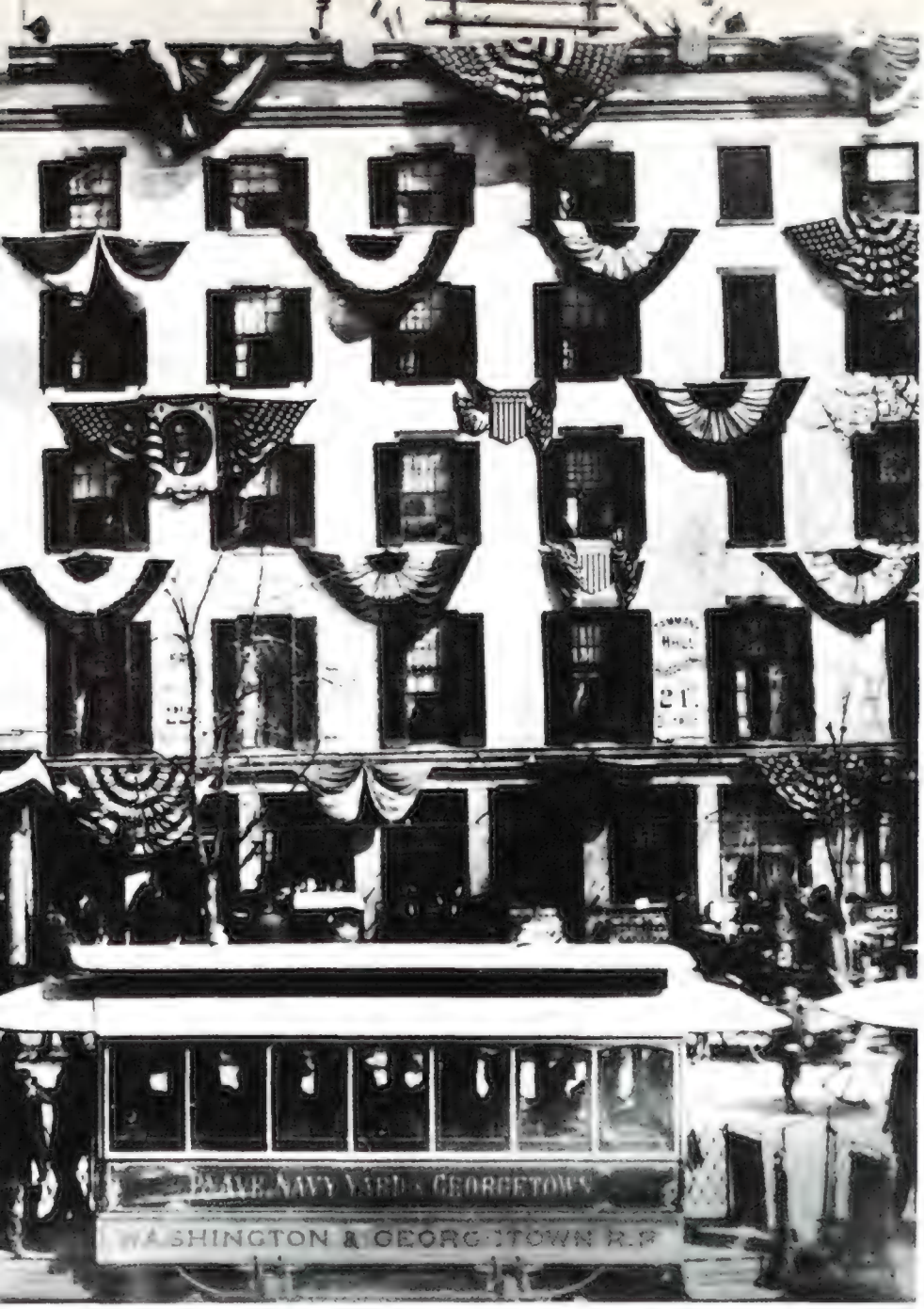
For years General Sickles visited the museum on the anniversary of the amputation, for another, nostalgic look at his leg.

Among the "capital losses" the city has suffered over the years, count (only they are countless) the vanished landmarks, stately or garish or corny, that once adorned Washington. Three are shown on these pages. The neoclassical pavilion was one of a pair that accented the great formal gardens of the Agriculture Department Building (also long gone) in the center of the Mall.

In the 1920s a visitor to the Agriculture Department could see, in some of the two dozen buildings (in addition to 35 greenhouses) on the grounds: demonstrations of machinery used in milking cows, making ice cream, cheese and pickles, condensing milk, packing meat, making jelly, canning and baking. Demonstrators even taught the public how to manage cooking stoves. The enormous garden was removed in 1931 when Congress authorized the grading of the Mall and its restoration to L'Enfant's plan; the greenhouses were razed to make room for an Army Air Forces intelligence unit early in World War II.

The Willard Hotel is an exception to the Washington rule that old landmarks die or just fade away. It appears above in its second incarnation on Pennsylvania Avenue; in its fourth lease on life, due to begin in 1981, it will present a taller, grander face to the world as the city's best remaining example of public architecture in the Beaux-Arts tradition.

Built originally as seven Federal row house rental units in 1818, the buildings were managed by Henry Willard as a small hotel from 1847-50; he then leased and remodeled them into the city's leading hotel in 1850, with a 94-foot-long kitchen flanked by rows of open fireplaces. In the decade before the Civil War, P. T. Barnum brought Jenny Lind here to have her sing in the new auditorium and to feed her the best hotel meals in town. Just before the war's outbreak, Willard tactfully arranged for his Southern guests to stay on one floor and use the 14th Street entrance, and for the Union to use the Pennsylvania Avenue door. Here



Portraits of New York's Governor Flower (left) and Tammany Hall boss Croker flank his; signs show hotel is one of Tammany's Inaugural headquarters.

Three thousand miles from a California sequoia grove, its original home, this massive stump, the General Noble Redwood Tree House, stood on Mall.

Julia Ward Howe wrote the lyrics of *The Battle Hymn of the Republic* after singing Union troops awakened her, marching past en route to the Virginia battlefields. Lincoln stayed here before his 1861 Inauguration, and Ulysses S. Grant, during his two terms, liked to sit in the first-floor corridor near the main desk to watch the lobby crowds from behind a folding screen.

The 82-year-old structure was replaced, starting in 1901, by the present Willard Hotel, now empty for a decade, saved from demolition in 1975 by preservationists and later bought by the government for reuse. It will be restored, and it will live on.

By all odds the most ancient "building" ever to serve as a local landmark was the General Noble Redwood Tree House, 2,000 years old when the giant sequoia was felled in 1892 in Tulare County, California. Fallers built a scaffold around the trunk (26 feet in diameter, 85 feet in circumference) 50 feet above the ground, and took a week to cut through it. When the 300-foot-high tree fell, it struck the scaffold and the woodcutters, jumping to the stump, were unable to stand for 20 minutes because of the shock from the vibrations.

The massive, hollowed stump was displayed at the World's Columbian Exposition in Chicago in 1892. Then it was moved to the Mall where visitors could climb its interior circular staircase for a view of the Agriculture Department's formal gardens below. There, surmounted with a peaked roof, dormer windows and redwood shingles, it stood west of the Smithsonian castle until the Mall was relandscaped in 1932.

When some landmarks go, it is a case of good riddance, but when esthetically valuable edifices go by default, it is a shame. Under the District of Columbia's Historic Landmark and Historic District Protection Act, which became law this year, no listed "district" or "building, structure, object or feature, and its site" may be altered or removed without approval—not easily obtained—from a review board and the mayor. It is, says Perry Fisher, executive director of the Columbia Historical Society, "perhaps the strongest pro-preservation law of any U.S. city."

The law came too late to save any of the landmarks

that illustrate this article. One was the Hooe Iron Building—its entrance is shown at the right. At the time it was erected in 1873, it was the city's largest privately owned office building and the largest cast-iron-fronted one ever built in Washington.

Until it was razed in 1926 for the National Press Building—itself now about to be torn down for redevelopment—the Hooe was an architectural rarity. Of the fewer than 20 cast-iron buildings put up in Washington, only a couple survive (New York City still has about 300, often painted light gray to resemble stone). For most of its life the Hooe's most prominent tenant was the U.S. Geological Survey (SMITHSONIAN, March 1979), which in 1912 officially compared conditions in the overcrowded headquarters to those of a "sweatshop" (extensions on the rear had cut off much light and air) before getting out in 1917.

A more lustrous landmark was the British Legation (opposite), which stood near Dupont Circle from 1872 to 1931. It was built after Minister Sir Edward Thornton persuaded the Foreign Office in London that it had been uneconomical to rent various residences during 72 years. His choice of a site (for which he paid 50 cents a square foot) was rather daring, the area then being remote and undeveloped. It did not remain so for long: within a few years Alexander Graham Bell and other well-off citizens put up mansions that made the neighborhood Washington's most exclusive residential section of the day.

Sir Edward built in fine, opulent style. When guests entered the great tiled vestibule they faced a grand staircase where the portrait of an 18-year-old Queen Victoria, in her coronation robes, looked down on them from the landing. Later a life-size portrait of Queen Mary hung on the north wall. A hand-carved mahogany balcony, shipped from England, encircled the entire second floor. A specially designed rug, walked upon by Victoria when she opened the Crystal Palace exhibit in London in 1851 (and removable for dancing), covered the ballroom floor.

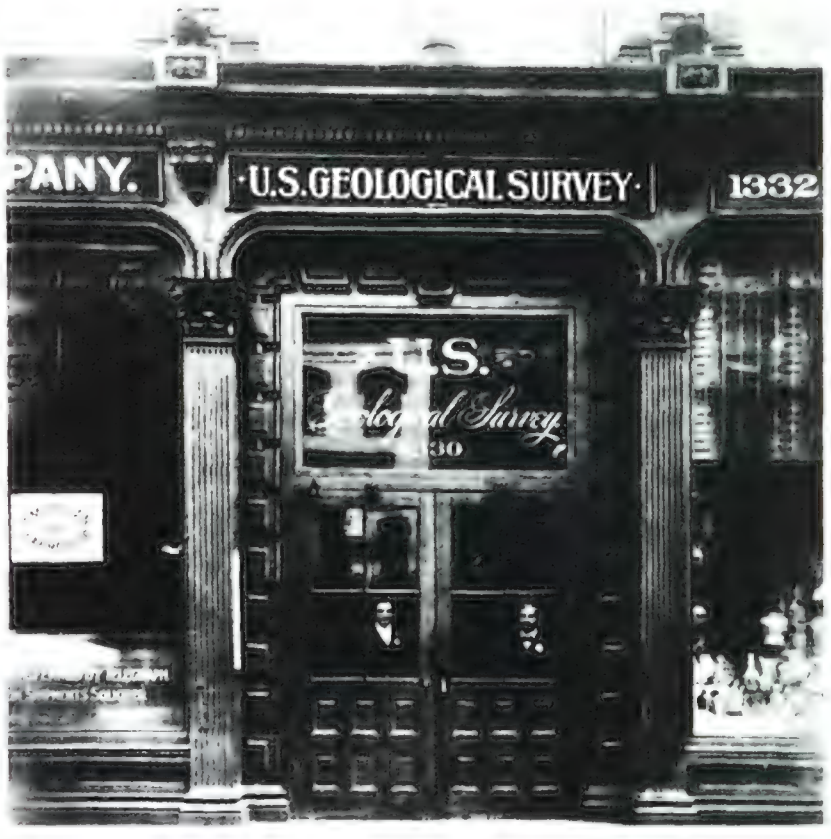
When the ministry was elevated to embassy by Congress in 1893, a successor to Thornton, Sir Julian Pauncefote, stole a march on his foreign-service colleagues. The papers appointing him British ambassador were rushed to Washington by fast passenger liner; by one day Sir Julian scooped the French and German emissaries and became dean of the diplomatic corps.

Though a strong traditionalist, Pauncefote was the first ambassador to send a typewritten letter to the U.S. State Department. The reply was typewritten, too, and the typewriter thereupon became part of official diplomatic office use in Washington.

In 1931 the British Embassy moved to its new Georgian Revival buildings on Massachusetts Avenue and the old landmark was razed—a grievous loss to the city.

Out of sight, out of mind has been the story with some great government structures—the temporary ones erected for wartime use or for Inaugurations and designed, many of them, by highly skilled and widely known architects. James A. Garfield's Inaugural parade of 1881 included perhaps the most elaborate "temporaries" ever built for such an event.

Thirty-eight large wooden arches, in a design that might be called Teutonic and named for the 38 states of the Union, straddled Pennsylvania Avenue at all



This was the imposing entrance to the Hooe Iron Building as it looked around 1890 when it was the home of the U.S. Geological Survey. It was the largest cast-iron-fronted structure in Washington.

Outside and in, the old British Legation building on Connecticut Avenue was a grand Second Empire design. Royal coat of arms surmounted porte cochere of this first foreign-owned legation in Washington.

the intersections between the Capitol and the White House. A thirty-ninth, the 70-foot-high principal arch (p. 66), painted a bronze tint, stretched over 15th Street across from the Treasury Department. Like streetcars, carriages, office windows and the White House itself, the arches were plastered with flags and bunting. General William Tecumseh Sherman was grand marshal of the Inaugural parade, and John Philip Sousa led the Marine Band under the arches. To climax the pageantry, the new President, who was to serve only four months before being assassinated, was host to 5,500 invited guests at a reception in the new National Museum, today the Smithsonian's Arts and Industries Building—a landmark entering its second century.

Garfield's actual swearing-in was on an uncovered stand at the U.S. Capitol. Since Franklin D. Roosevelt's first Inaugural in 1933, neoclassical covered stands with Corinthian columns have been used, then dismantled, stored and reassembled next time around. The continuity of use of the Roosevelt Inaugural stand, unchanged in style for nearly half a century, is a rarity indeed. For regardless of the quality of design of government—and privately owned—buildings, they have been razed without sufficient thought for the city's architectural heritage by succeeding generations of bureaucrats, either because the building in question was no longer in style or because an even grander master plan called for clearing some vast area for new clusters of buildings.

A case in point occurred in 1951 when Washington began to test the urban-renewal program on a grand scale—to "save the city." In southwest Washington, a low-income area south of the Mall, more than 800 acres of 19th-century buildings were eventually leveled. Many had degenerated into slums, but a whole urban personality, composed of noteworthy Greek Revival and Victorian houses and churches, was in-

discriminately replaced by blank blocks of "international" style attached houses and multistory apartment buildings. What could have been a sensitive restoration involving a mixed program—retaining the best Victorian structures as well as building new housing units—was not adopted.

Still, one major scheme—to make Pennsylvania Avenue into an impressive ceremonial route and to bring back both commercial and residential life to the old inner city—is in progress. The elegant 1901 Beaux-Arts Willard Hotel (which replaced the building shown on pp. 62-63) will be part of the restoration. The historic 1899 Romanesque Revival Post Office Building within the Federal Triangle government complex is being restored after a close call, avoiding the wrecking ball. The Pennsylvania Avenue Development Authority, established by Congress, has agreed to allow dozens of otherwise doomed historic commercial buildings to survive. It is the first time that a government agency has tried to save the best among a group of condemned buildings.

It is to be hoped that the new historic-landmark law will prevent the government's wholesale destruction of important historic rows and blocks of Washington's privately owned buildings whenever a new Congressional parking lot or office building is needed. With a slowly but constantly increasing interest and appreciation by the public of high architectural quality, the odds are getting better every day for the preservation both of government buildings of outstanding design and of handsome private buildings—avoiding their destruction in the name of "progress."

As James A. Garfield's Inaugural parade neared the White House it passed under this arch over 15th Street. This was the largest and most lavish of 39 arches along the line of march from the Capitol.

It's better to give than receive. With certain possible exceptions.

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By Noel D. Vietmeyer

A wild relative may give corn perennial genes

A newly discovered species of teosinte turns up on a Mexican mountain with a trait that could transform our crops

In illustration from the 1870s, one corn variety shows irregularities lost in uniformity of modern hybrids.

Corn is the staff of life for the New World, the single most important food plant of all the Americas, the largest crop harvested in the United States. Pluck corn from your way of life and the changes would be surprising. For you may rely on corn products each time you read a magazine, walk across a carpet, mail a letter (cornstarch is used as sizing on textiles and paper and as glue on stamps), dine on a steak, take a beer, a soft drink or a whiskey, eat bread or candy, chew gum, light a match, or take an aspirin or penicillin. Corn products are in paints, soaps, dry batteries, cosmetics and dynamite; they are used when drilling for oil, manufacturing tires, molding plastics and in many more processes and products. There is even a hope that gasohol, some of it derived from corn, soon may be fueling many of the nation's automobiles.

But, for all our dependence on the plant, its production rests, like an upside-down pyramid, on a tiny genetic base. Corn plants have been redesigned until they are as alike as twins. More than 70 percent of the U.S. corn acreage is planted with varieties based on just six parent lines. Billions of nearly identical plants are lined up in the farm fields of the nation, and what makes one plant susceptible to a disease or a change in climate makes them all susceptible. A disease can cut through them as swiftly as a prairie fire.

Where the weather is reliable, such uniform fields of the most productive varieties are highly desirable, provided they can be shielded from pests. But from time to time, insects, viruses and fungi mutate, bringing into being new and often virulent strains that cannot be anticipated. In the past when these arose they failed to spread because the corn crop was so variable. But today the mutants can tear through the huge, homogeneous American cornfields faster than a new strain of Hong Kong flu could sweep through the American populace.

To meet the threats from the ever-changing pathogens, geneticists and corn breeders have selected varieties for resistance to an array of different insects, viruses and molds, as well as drought and wind. In addition, they have made corn into something of a bionic plant. They have changed it to meet precise requirements of industry, of different farm animals, and the

Modern field corn ripens on a Pennsylvania farm in genetically uniform rows. Although scientists have redesigned plants to increase productivity, these hybrids are precariously susceptible to new blights.

whims of human preference. They have modified the quantity and quality of its protein, starch, oil and sugar, and even the efficiency of its photosynthesis.

Now, the possibility of another exciting and fundamental change in corn has been raised by remarkable discoveries in Mexico. Two years ago in the state of Jalisco, undergraduate in botany Rafael Guzmán of the University of Guadalajara found a strange corn-like plant. This discovery was the botanical counterpart of falling over a live dodo.

The plant was a form of teosinte (pronounced tee-o-sin-tee), a wild species that is corn's closest relative. The annual form of teosinte is still found in remote areas of Mexico and Guatemala, but what Guzmán found was a perennial type that grows up from the same root stock year after year. It had been noticed only a few times since its discovery, near a railroad station in Jalisco in 1910, by Dr. Albert Hitchcock of the Smithsonian Institution. Indeed, intensive searches for it since 1921 had all ended in complete failure, so most botanists had assumed that perennial teosinte was extinct in the wild.

Guzmán was searching for perennial teosinte because his botany professor, Maria Luz Puga, thought that it might still exist and had challenged the class to rediscover it. The plant he found was a tiny, immature thing, barely a foot high. But back in the University garden it flowered and caught the eye of a

fellow student who told Guzmán that more of it was growing on his grandfather's land high in the Sierra de Manantlán. Guzmán hiked ten strenuous hours only to find that it was the annual teosinte. But as he was collecting seed, a man came by on a mule and told him that 12 kilometers farther back on the mountain he'd find a field of what he was seeking.

Again Guzmán set off, and dawn brought him the long-dreamed-of sight: hundreds of teosinte plants, each with the root rhizomes that make it perennial. But something even more spectacular was to follow.

Guzmán sent a sample of seed to Hugh Iltis, professor of botany at the University of Wisconsin. Perennial teosinte has interested botanists far more than farmers because, having twice as many chromosomes as corn, it is not able to be bred with corn. Iltis shared the seeds with graduate student John Doebley, who grew them in pots in the backyard of his home in Madison. But when he brought the plants to the laboratory Iltis was immediately suspicious: "Somehow they didn't look right," he explains, "so I pleaded with Batia Pazy to run a chromosome count on them."

Dr. Pazy was busy working on other projects, but, responding to Iltis, she took a morning off, ran the chromosome count and announced that although she wasn't sure of the number, it certainly wasn't 40, the number perennial teosinte is supposed to have.

"Then," says Iltis, "we looked at each other, and it took only a few seconds to realize what we had. In that pot was a relative of corn whose existence we had never dreamed of."

The new perennial species, *Zea diploperennis,* which Iltis believes is the most primitive living relative of corn, proved to have 20 chromosomes, as does corn. The two crossbreed: the pollen from the tassels of one fertilizes the silk of the other to produce coblike fruits that seem to be fertile. This suddenly made the new discovery interesting to both botanists *and* farmers. Corn breeders all over the world quickly began requesting seed. Much of corn's cost goes to plowing under the old crop and sowing the new one; *Zea diploperennis* has awakened hopes for a perennial corn that farmers could harvest each year without replanting.

"It's a wonderful new plant. No doubt about it!" says Iltis. "It will probably be crossed with corn at least 10,000 times in the next ten years. It is immune to several major corn virus diseases, and it survives in cool mountains in Mexico so that, through crossbreeding, we might eventually be able to get perennial corn to grow in the Southern states."

Zea perennis, a perennial teosinte, has too many chromosomes to interbreed with modern annual corn.

Noel D. Vietmeyer, a specialist in tropical agriculture at National Academy of Sciences, wrote on Papua New Guinea butterfly ranching in the May 1979 issue.

Zea diploperennis, with the right chromosome count, raises hopes of breeding a modern perennial corn crop.

Because it is so primitive, *Zea diploperennis* has much to teach us about corn genetics. "It could be a 'Rosetta stone' for understanding the evolution of corn," Iltis suggests. "With luck, we may well solve many a scientific mystery."

He is referring to the fact that corn's ancestry is uncertain. No other grass species bears multiple rows of seeds on a rigid axis, the cob; so there is no obvious ancestor. Yet, the cob is the key to corn. Where did it come from?

Teosinte is a close relative, but whether it is the parent, brother or nephew of corn is the subject of a great scientific controversy. Viewed from a distance the two are hard to distinguish, for both have similar leaves and they both possess separate male (tassels) and female (silk) flowers. A number of botanists argue zealously that teosinte is indeed the progenitor of corn, but this idea is disputed by others with equal fervor.

Iltis is among those who are convinced that teosinte is the parent of corn, and in 1978 he and John Doebley set out to see the new perennial form.

After four days of back-road driving they, together with Guzmán, arrived at the base of the precipitous escarpment of the Sierra de Manantlán. On four rented mules, two horses and a donkey, and with a supporting party of local Indians, they followed narrow footpaths up through cloud forests filled with mosses and lichens, and on up through open pine forest until they arrived at a fog-shrouded saddle on a rocky northeast slope at about 8,000 feet.

Below them was a quilt of tiny corn patches bordered by wild flowers in full bloom. Next to a stream Guzmán dismounted. Around him were dense thickets of teosinte plants—the *Zea diploperennis* they were seeking—as tall as a man and in full tassel.

"My heart was really beating," Iltis recalls, "when I saw this teosinte here at last . . . alive! Once off my mule I started to dig out a big clump on the edge of a deep cold rivulet to see its roots. It had fat short rhizomes, the like of which I had never seen. I said to Doebley in practically a whisper, 'This damn thing's got tubers, it's different, all right!' "

Over the next four hours the whole group fanned out collecting specimens "like crazy." "It was tremendously exciting," Iltis recalls. "Exhilarating!"

The new species appears more grasslike than corn does; its several stalks fan outward from the root crown. Many specimens were growing in stream beds, suggesting the possibility of using it to breed corn to withstand damp sites where the crop now easily becomes diseased.

A weed worth billions

Nearby was an old hut beneath six immense yucca trees. The Indian owner explained (with translation to Iltis by his guide) that he actually used the rock-hard teosinte grain, ground up and mixed with corn meal, in tortillas—but only in time of famine.

"So," says Iltis, "here was an almost useless plant that had tremendous economic and botanic importance. A weed sitting out there on the mountainside, barely used by anyone, yet you could estimate its potential value to our corn crop in billions of dollars!"

This is perhaps the most important implication of the new discoveries. To keep our crops continually evolving to meet the mutations of pests and other changes in the environment, as well as Man's needs, we need reserves from which to draw breeding stock.

A rich reserve of disease resistance, cold tolerance, protein, oil and a myriad of other properties is to be found in teosinte and in the primitive Indian corns of

the Americas. Their diverse genes provide a kind of backup to be thrown into the breach, especially in times of emergency.

The reason is that, in the perhaps 10,000 years since the plant's domestication, corn growing spread to many different environments, creating an enormous wealth of locally adapted races. Most Indians kept aside a few seeds for planting the following year, and so different strains arose in the neighboring fields of different families. These "family strains" exist in out-of-the-way places and few have been characterized or included in the leading corn varieties of today. Their response to pathogens or environmental stress is unknown. But they often grow alongside of, and compete with, many other corn strains as well as weedy species, and this competition imbues them with robust and disease-resistant qualities.

Some of them have quite unexpected properties. For instance, the corn of the Pima and Papago Indians in Arizona thrives in the desert heat and matures in just 60 days (corn-belt farmers expect 100-120 days). The Indians get two crops a year with it.

The variability to ensure continued progress in corn breeding is available in this vast living, evolving "storehouse." It is not stocked, however, with finished products. A primitive race of corn in itself does not usually meet the requirements for economic use on a Midwestern farm. A desired genetic quality (resistance to a particular fungus, for example) has to be teased out of the chromosomes of an exotic corn in a process of crossing and backcrossing with an advanced variety until the combination expresses the best qualities of each. The process requires at least five years.

What is happening to corn's genetic "reserves" horrifies many plant scientists. Ancient varieties in the more remote parts of Latin America are being deliberately replaced by higher-yielding, uniform, modern hybrid corn, and the wild teosintes are being exterminated. In many areas, it is too late to salvage much.

"The process by which the highly productive modern ear of maize has evolved is in grave danger of disappearing," maintains Garrison Wilkes of the University of Massachusetts. "It's a paradox: the product of technology displaces the resource upon which the technology is based. It is analogous to taking stone from the foundation to repair the roof."

One of the next casualties may well be the newly discovered *Zea diploperennis*. "It is found only on three acres—no more," Iltis notes. "There are perhaps one or two thousand plants of it in all the world. Introduce ten Holsteins and this billion-dollar resource is gone—forever!"

Teosinte researchers with their plant are (left to right) botany students John Doebley and Raphael Guzmán, professors Maria Luz Puga and Hugh Iltis.

All over the world—but especially in the tropics—the wild relatives of our crops are being destroyed. Iltis calls it plant genocide. Throughout Latin America, for example, hundreds of corn varieties and thousands of strains with potentially valuable attributes are on the verge of disappearing or have gone already. In Colombia and Mexico many ancient forms of corn are now hard to find, and along the western slope of Mexico and Guatemala, much of the annual teosinte has vanished as roads and farmers roll into the more remote areas to grow more food for an exploding population or even to grow strawberries for export to the United States.

Corn is particularly vulnerable because it can't support itself without our help. Corn's evolution has been so much tailored to human needs that its fruiting structure—the female ear with its permanently attached seeds—no longer can reproduce the species. Not only do the husks around an ear of corn block the seeds' dispersal; even on a shucked ear the seeds germinate still attached to the cob, producing plants that are so crowded they choke each other and fail to flower. A man or machine must remove the seeds from the cob and scatter them over the soil before corn will produce enough progeny to keep itself from extinction. This makes us the guardians of corn's future.

At University of Guadalajara greenhouse, Guzmán stands between species of perennial teosinte he found, *Zea perennis* (left), *Zea diploperennis* (right).

Many of the old corn types widely used across the United States before World War II were essentially lost as new hybrids were developed. And today, when a Mexican farmer or a Hopi Indian abandons the crop variety that has traditionally fed his family, it may become extinct in a year—even less if he eats all the seed that he normally saves for replanting. Says Wilkes: "The genetic heritage of a millennium can disappear in a single bowl of porridge!"

Corn genes can be stored only in the embryo of a living seed kernel; once the seed is dead, its genes can no longer be retrieved. Evolution, unlike history, cannot be depended upon to repeat itself.

Seed banks: a hedge against starvation

Some genetic diversity is preserved in collections of corn germ plasm and seeds. The biggest collection, at the International Maize and Wheat Improvement Center, was begun by an agency of the Mexican Ministry of Agriculture some 30 years ago. In its refrigerated concrete chambers near Mexico City are stored 13,000 different items, the majority of them *Zea mays*, or corn. That is not a lot. And the process is cumbersome because seeds lose viability over a decade or two and have to be periodically replanted and the seeds reharvested to keep the strains alive. Plant genetic material in storage is also vulnerable to power failures. Not long ago, one year's harvest of potato tubers was lost at the U.S. storage facility for potato germ plasm at Sturgeon Bay, Wisconsin, in this way. Nonetheless, our future depends on such "banks." Seed collections "stand between us and catastrophic starvation on a scale we cannot imagine," warns Jack Harlan of the University of Illinois. "In a very real sense, the future of the human race rides on these materials." Yet, he points out, no seed collection in the world is adequate.

In the case of corn, the fields of Indian farmers in Central and South America could be an alternative. They are cradle areas that preserve old strains and evolve new ones.

"To complement seed collections," says Iltis, "it is imperative that particular remote areas of Mexico, Guatemala and Peru that use primitive types of corn

Southern corn leaf blight which swept through much of U.S. crop in 1970 attacked the leaves, stalks and ears of plants. Mutant fungus caused it, but the genetically uniform crop had virtually no resistance.

Fungus wipes out rows of field corn during 1970 blight. Once a field was infected there was no effective treatment; the nation lost 15 percent of its crop. Resistant varieties were introduced by the next year.

be placed off limits to agricultural aid and to the deliberate widespread introduction of improved corns. There, at least, we have to keep the Green Revolution out and 'freeze the genetic landscape' for future generations." In short, let the farmers plant the types they always have.

Many plant geneticists agree. But how can the cradle regions be protected? It is the global community that depends on them: Indian farmers in the hill lands of Mexico, Guatemala and Peru can't be denied the advantages of modern hybrids. To them, high-yield corn may be a blessing.

Some sort of subsidy is needed so that the primitive farms can be maintained as genetic parks, after the fashion of national parks. If corn could reproduce itself effectively, such parks could be wilderness areas with the plants left to breed and evolve by themselves. But a corn preserve has to be in farmers' fields.

The world will need those "primitive" corn types. Nothing demonstrates this better than the saga of our corn blight a few years ago.

In 1970 a devastating disease, the Southern corn leaf blight, spread swiftly over the American corn crop. The epidemic was unexpected; it caught the nation with no defense and no reserves.

In the past the fungus *Helminthosporium maydis* had rotted some ears and withered some leaves, but had never been deemed very important. Then in 1969, a virulent new mutant popped up in Illinois. Later that year, it was already infecting the winter crop in Florida, and with the warm, damp season of 1970, its wind-borne spores soon blighted fields from the Great Lakes to the Gulf of Mexico. In severely diseased areas, clouds of sooty spores danced darkly over combines.

It was an impressive event. The corn belt almost came unbuckled. About 15 percent of its crop was destroyed; much of the rest was threatened. In some Southern states, more than half the crop was lost.

The only plants badly affected, however, were those descended from parents possessing what corn breeders call "Texas" cytoplasm. The plants with normal cytoplasm were little affected.

The use of "Texas" cytoplasm revolutionized the production of hybrid corn seed. Because its pollen was

sterile, the female parent did not have to be detasseled by man or machine. But what was not foreseen was the extent of the vulnerability when the nation's corn crop became so uniform.

The situation was corrected by producing hybrid seed with other than "Texas" cytoplasm. Thanks to heroic efforts by geneticists and corn breeders, the five-year delay was avoided and resistant seed was already in production by the end of 1970. It was multiplied in plots in Florida and Latin America that winter, but it wasn't until 1973 that enough seed was produced to supply all the farmers who needed it.

The corn blight caused higher food prices in the United States, but in countries such as Guatemala and Kenya, where half of the diet is corn, such a crop failure would have brought disastrous starvation.

The scary thing is that it could happen again. We are in fact even more vulnerable today. The blight of 1970 was not foreseen. And there are other pathogens with the potential to produce an epidemic like that caused by *Helminthosporium maydis.*

"Actually, there is nothing biologically unsound about breeding for high yields and using a narrow genetic base," explains Wilkes, "but you have to maintain a ready reserve of genetic diversity such as that which still exists in native agriculture. It is unthinkable not to preserve that."

And that is the ultimate message of the exceptional discovery of *Zea diploperennis,* the weedy, useless, perennial wild teosinte could be lost forever if a single Indian farmer, high on a remote mountainside in Mexico, decided to plant a high-yield hybrid.

Ears of corn collected by Hugh Iltis from one Mexican farmer's bin illustrate the immense genetic diversity of native Indian corn. These, with teosinte, hold big storehouse of genes needed to protect modern hybrids.

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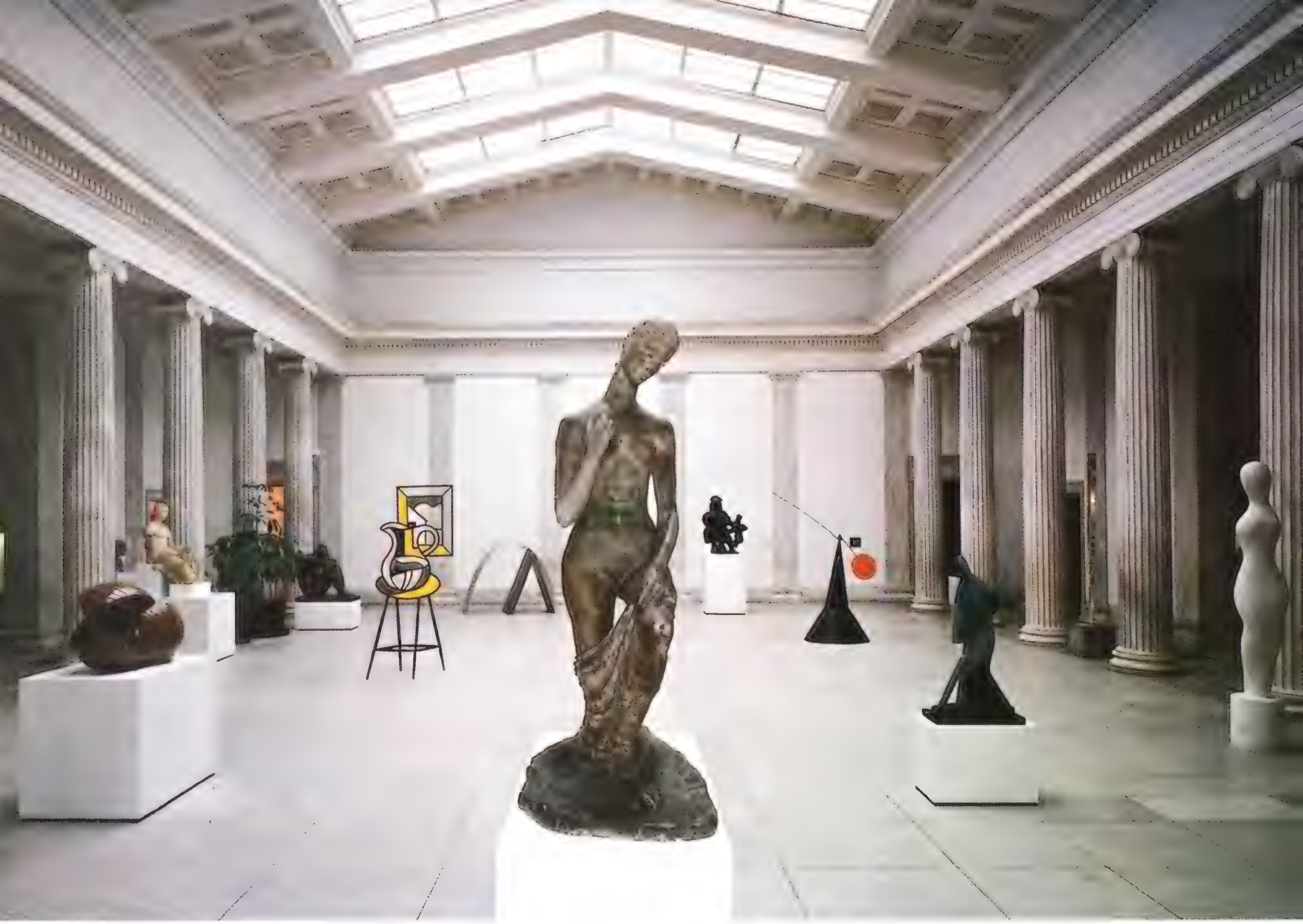


Sculpture court houses modern works by such Europeans and Americans as Wilhelm Lehmbruck, *Kneeling Woman* (center), Roy Lichtenstein, *Picture and Pitcher* (left), Alexander Calder, *Cone* (right).

By John Russell

A warm setting for modern art in snowy Buffalo

With foresight—and shrewd buying—an heir to a Woolworth fortune made a venerable gallery into a great center for recent masters

Inch for inch, and painting for painting, no museum in this country can better the Albright-Knox in Buffalo when it comes to the art of the second half of this century. There is a sense of consistent quality about what we see on the walls of the Albright-Knox that cannot quite be paralleled anywhere else. Even in the Museum of Modern Art in New York there are dead spaces: rooms from which inspiration has ebbed away and may never come back. There are wonderful museum buildings—like the one which Philip Johnson designed for Corpus Christi, Texas—that have nothing in particular to go with them. There are very good collections—like those of the Guggenheim Museum—that for one reason or another are not often on exhibition. But for a panorama of art from 1945 to the present day that sits there in immaculate surroundings (made even more so in winter by Buffalo's proverbial snows), it would be difficult to beat the Albright-Knox Art Gallery.

"Albright-Knox?" our grandfathers would say. "We know the Albright Art Gallery in Buffalo. It's that neoclassical building in a park, some way from the

Color photographs by Enrico Ferorelli

Original 1905 museum is in neoclassical style, but its simple dignity gives hospitable space to works of contemporary art. Gordon Bunshaft's gleaming new auditorium stands in contrast at far left.

city. Some kind of private museum, isn't it? But what's it got to do with modern art?"

Well, of course, it all depends on which grandfather you have. But it is true that the Albright Art Gallery was named after John J. Albright, who gave it to the Buffalo Fine Arts Academy, that for many years it consisted of a Greek Revival building completed in 1905, that objects in its collections go back to the year 3000 B.C., and that until the 1930s they had almost no connection with modern times.

It is a distinguished affair, that original building. It is well planned, well sited and well lit, and when it comes to showing modern paintings and sculpture those old-fashioned rooms have a simple dignity that sits very well with Clyfford Still and Jackson Pollock.

Even so, that building is firmly lodged in the past. When something called the Room of Contemporary Art was founded at the Albright Art Gallery in 1939 during the directorship of Gordon Washburn, few people thought that contemporary art was what the museum would one day be famous for. Very good things were done under Mr. Washburn's directorship; and when Andrew Carnduff Ritchie took over (from 1942 to 1949), he showed a spirit of initiative in the field of modern art which was to pay off enormously well when he became Director of the Yale Art Gallery. But Buffalo is a conservative place, and until quite recently nobody there thought much of modern art. Buffalo's involvements lay elsewhere, and in the close-knit community which set the tone for the city, high marks were not given for close acquaintance with Picasso and Matisse. So there was no private money for advanced art; and as for going down to City Hall and getting public money for that kind of purpose—well, he would be a brave man who tried it.

Meanwhile the museum had its benefactors, and as is the custom in museums the world over, the more generous among them got to have their names on the wall. In the room which contains paintings by Hogarth, Reynolds, Romney and Lawrence, the visitor will find the names of Seymour H. Knox (1861-1915)

John Russell writes art criticism for the New York Times *and is the author of many books on modern art.*

Gordon M. Smith, photographed with his dog, Bozie, before his death this year, was the creative director.

and his wife Grace M. Knox (1862-1936). S. H. Knox was a chain-storekeeper who in 1912 merged with a cousin of his to form a concern known the world over as "Woolworth's." Seymour H. Knox II was born in 1898, grew up and got married in Buffalo, and built for himself around 50 years ago a combination of town-and-country house on a broad side street of the city.

He could have lived for pleasure. Already at Yale he was a considerable athlete, and he went on to become a world-class polo player, a first-rate rider to hounds, an excellent shot, and a squash rackets player who was good enough to tour overseas. Helen Knox had a very good seat on a horse, and their son Northrup became the champion of the world at court tennis (the ancient and esoteric royal game). These were activities that in another man could have been all-absorbing. But Seymour Knox wanted to succeed on his own, and he began at the bottom in the Marine Midland Bank and ended up as the head of it. Meanwhile, he and his wife kept pretty much to Buffalonian ways; but they bought themselves some very pleasant pictures of living-room size and from time to time Seymour Knox would help out with an acquisition for the Albright Art Gallery.

It was in 1955—so the record says—that all this was changed. The Albright Art Gallery had at that time a new director in the person of the late Gordon M. Smith. Mr. Smith had excellent credentials. He had taken the course by Paul Sachs at the Fogg Art Museum in Cambridge, Massachusetts, which seems in retrospect to have nurtured pretty well every great American museum director. He had run a small museum, the Currier Gallery of Art, in Manchester, New Hampshire, and made it interesting enough for people to make a habit of driving up from Boston to see what was the newest thing in art. Quite as important as any of that was the fact that he was not at all the reticent scholar. He was a tall, stylish, well-dressed, well-spoken and very amusing man (above).

Gordon Smith saw it as the duty of a museum director to build a great collection. As there was no public money in Buffalo for that sort of thing, he needed private donors: ideally and unthinkably, he needed one private donor who would step into what was at that time a vacuum. In 1955 such a donor could do prodigiously well in a field that most moneyed people did not yet believe in: the American art of their own time.

Such a man had lived in Buffalo not long before. A. Conger Goodyear had liked modern art, and had guided the Albright Gallery to an important early acquisition, a Picasso called *La Toilette*. It looks terrific in the museum today—all the more so, perhaps, in that the museum largely missed out on Picasso during the years when his work was relatively cheap—but at the time Goodyear had to put up with a lot of mockery in the city. Feeling ran strong on this point, and when Conger Goodyear was away in Europe his fellow trustees got together and voted him off the board. Goodyear didn't care for that and he very soon went to New York, where he became one of the founders of the Museum of Modern Art.

What Gordon Smith needed was a Conger Goodyear

Seymour Knox II, banker, sportsman and benefactor of the gallery, with sons, Northrup (left) and Seymour III, both members of the gallery board. Behind them is Clyfford Still's "terribly black" *1954*.

with a sense of humor who would tackle the art of his own day. He found him in Seymour Knox. Then as now, Mr. Knox had a great sense of fun. He was a great man of business, but he didn't let business eat him alive. He is as shrewd a man as you will ever meet, and it takes him no time at all to see through pomp and pretension. He and Smith were made for each other.

Between 1955 and 1958 they made a terrific beginning. They were on to the fundamental fact about buying for a museum, which is that it is quite unlike buying for a private house. A museum needs the biggest, strongest, most uncompromising statement that the artist in question has made.

There was not much of a museum market in 1955 for the great American paintings of the day, but even so they were beginning to cost real money. Seymour Knox's younger son, Northrup R. Knox, was at the tennis court one day when his father arrived in a state of simulated agitation. "D'you know what?" he said. "This man here wants me to spend $10,000 on a picture. What am I to do with him?" "This man" was Gordon Smith, of course, and the picture in question was *The Liver is the Cock's Comb* of 1944, which most good judges would rank as the best picture ever painted by Arshile Gorky. Gorky had died in 1948. The picture was large (73¼ by 98 inches) and disturbing. "These people already think I'm crazy," Knox said to Smith, "and you've come along to make it worse."

Be that as it may, the present and world-known look of the museum was determined by Knox and Smith between 1955 and 1958. With major paintings by Willem de Kooning, Mark Rothko, Jackson Pollock, Franz Kline, Robert Motherwell, Richard Diebenkorn, Helen Frankenthaler and Philip Guston, together with sculptures by David Smith and David Hare, the museum began to look like a place in which no bets were hedged.

Seymour Knox listened carefully to Gordon Smith. To an outsider, their exchanges often had the air of a freewheeling comedy routine in which two old pros took delight in one another's skill and invention. But Seymour Knox is an intelligent and very strong-minded man who doesn't let anyone tell him what to think, and in the end it turned out that, within the general historical framework for which Smith was responsible, Knox had a marked personal taste and generally got his way in the expression of it.

To visit art galleries, whether in New York or elsewhere, became one of Seymour Knox's greatest pleasures. Sometimes he went with Gordon Smith, some-

times they went separately. Either way, they turned out to choose the same painting nine times out of ten. No one ever had to sell them anything; they made up their minds for themselves. In Europe they acted the same way, except that Knox mostly went over in the spring and Smith mostly went over in the summer. Once again, the marriage of two minds knew no impediment: major pieces by Francis Bacon, Ben Nicholson, Alberto Giacometti, Victor Pasmore, Barbara Hepworth and others came to join their American contemporaries.

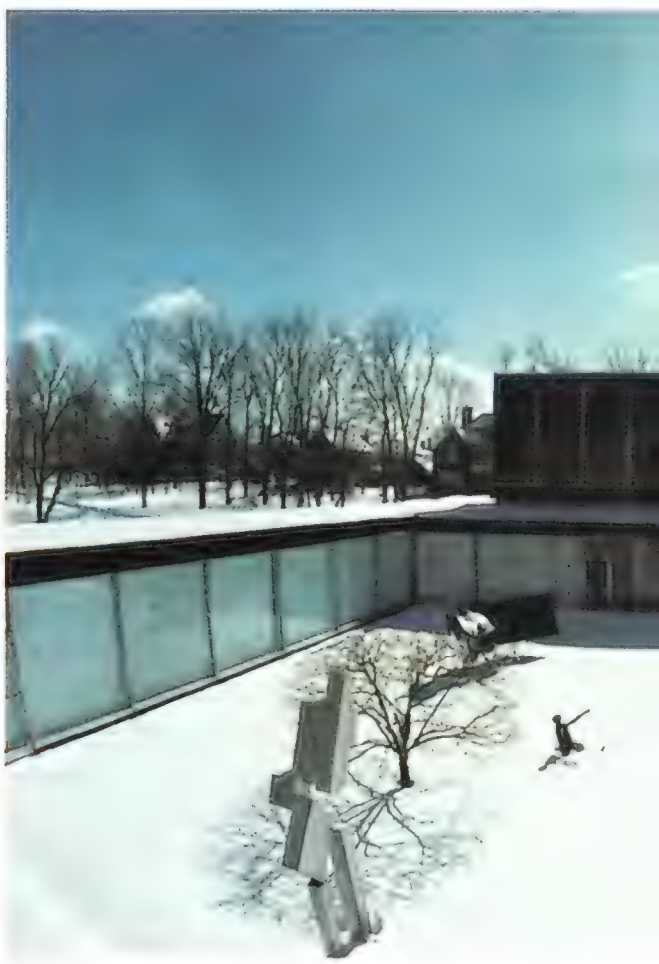
Activity of this sort does not go unnoticed in the galleries; and Gordon Smith remembered that although Seymour Knox never cared to put himself forward, he did say to him, around 1960, "Gordon, I think you could start telling people who you are when you go into these galleries. They've begun to hear of us, I think." Undeniably they had. It was getting around that Albright (as it was still called) had acquired some of the most beautiful American paintings of the decade and was notably adventurous and unprejudiced in its forays into Europe.

Seymour Knox had no trouble liking what came after Abstract Expressionism, and there is no museum in the country that would not be proud to possess Jasper Johns' *Numbers in Color* (1959), Robert Rauschenberg's *Painting with Red Letter S* (1957) and the big-scale paintings by Ellsworth Kelly, Frank Stella, Roy Lichtenstein, Robert Indiana, James Rosenquist and Jim Dine bought in the early 1960s.

Knox and Smith between them were on their way to yet another remarkable coup: the gift by the artist himself, in 1964, of 31 large paintings by Clyfford Still. This made Buffalo the place of all places in which to study this most reclusive and wary of painters. Gordon Smith had hoped for years to get a painting by Still, and in 1956 he finally got an appointment to see him late at night in his New York studio. Mr. Still doesn't usually see anyone from the critical or curatorial establishment, but he did see Gordon Smith, and after some conversation he agreed to sell him a painting—but on one condition: that a decision should be forthcoming immediately. There were to be no delays, no committee meetings, no arguments back and forth: just a straight Yes or No. And *fast*.

Gordon Smith said that there would be no difficulty about that. He would just have to make one telephone call in the morning. Very well, said Mr. Still, clearly incredulous of so swift a resolution. If Smith would call him at a certain number at exactly noon, Mr. Still would be waiting by the receiver (the number in question was that of a nearby public pay booth). Smith called Knox. "I suppose that picture's terribly black?" asked Seymour Knox. "But you've always said we

One of many contemporary paintings given by Seymour Knox is Frank Stella's *Bonin night heron.*



Starkly outlined against the snow, important pieces stand in the

wanted a Still, so if it's one you like, go ahead." Smith put in a call at 1200 hours exactly, Mr. Still picked it up on the first ring, and the Gallery acquired *1954*, a canvas measuring 113½ by 156 inches. Clyfford Still was amazed and intrigued that any museum should operate so informally and with such dispatch; and in time, after further experience with Knox and Smith, he came up with a gift as munificent of its kind as any that an American museum has received.

The sheer size of Still's *1954* was one of many indications that the original building of the Albright Art Gallery was quite inadequate for its new obligations. Not only were the galleries themselves too few, but there were none of the auxiliary amenities that visitors to a first-rank modern museum had come to expect. There was no place to eat, for instance. There was no auditorium. The offices were below ground and very uncomfortable. There was no room for the collection, no room for temporary exhibitions. It was high time that all this was looked into, and action taken.

Other museums have to go out into the bushes to raise money for projects of this kind. With Seymour Knox around, there was no question of that. Knox thought it over carefully and said, in effect, "Just find the right man and send me the bill."

Knox and Smith were bent on finding an architect who was as much of an artist in his own field as any of the painters whom they had bought in such quantity. They found him in Gordon Bunshaft of Skidmore, Owings & Merrill. The building was finished in 1962, and the name of the museum was changed at that time to Albright-Knox Art Gallery.

The new wing was the antithesis of the old building. Bunshaft saw it in terms of black and white, with plenty of glass where glass was needed and an inner courtyard in which white pebbles gave off a blaze of reflected light. Indoors, white floors remind us that Buffalo at certain times of the year seems to be a suburb of the Arctic Circle. Every office looks onto the central garden. "When Nelson Rockefeller was governor," Gordon Smith once remarked, "he used to walk into the garden and throw a stone at my window, just to say he was stopping by." The restaurant has nothing of the penitential look that often haunts such places. It turned out to be a very good place for the dinners that Seymour Knox likes to give from time to time. And those dinners are great fun; Mr. Knox has a way of seeing to it that people enjoy themselves—so much so, in fact, that they are usually in no hurry to leave. For this reason the gallery was once spoken of as "the All-Night Knox Art Gallery" by a bemused visitor from Europe.

When Gordon Smith retired in 1973 Robert T. Buck jr. was appointed his successor. As he had been

new wing's sculpture garden. The two arms are lateral galleries.

Painted in 1960, Adolph Gottlieb's *Dialogue I*, above, was given to the collection by Knox in 1961.

assistant director since 1970, he knew the gallery, he knew the collection, and he knew Mr. Knox. He also, of course, knew the gallery's financial structure. (Three-quarters of the gallery's budget is now met with public monies—from the city, state or federal government.) So there was every reason to foresee the jolt-free transition which has in fact occurred.

Museum directors are human, however. No more than the rest of us do they care to be regarded as trousered ciphers who exist merely to carry out orders. Robert Buck sees it as the duty of the Albright-Knox to resist the magnetic pull that is exerted upon so many outlying museums by New York City power, New York talent and New York taste. The one-person shows that have been put on in Buffalo since Buck became director have been primarily by artists who for one reason or another are not in the mainstream of New York taste: Max Bill, a Swiss; Sam Francis, an American who has lived much in Europe; Bridget Riley, an Englishwoman; Cleve Gray, an American who never puts himself forward; and Richard Diebenkorn, a Californian who never even thinks about New York. For next year, the Albright-Knox has in hand a retrospective of the work of Sonia Delaunay, now in her 90s and (along with Marc Chagall) the only remaining survivor of the pre-1914 Parisian art world.

Buck and his curators are also of one mind in believing that art no longer consists of painting and sculpture only. If artists want to work with video or—like Paul Sharits of Buffalo University—to paint directly onto film, they are welcome at the Albright-Knox. (Artists who show at the gallery are now invited to document their visits on videotape.)

As for Seymour H. Knox II, he is still as bright as a berry. Where other men of his age and standing head for an English club-style leather sofa at the end of the day, he sinks into a free-form scarlet object that turns out to double as a very comfortable armchair. Where other chairmen of the board can't wait to get at the *Wall Street Journal* when they come down in the morning, Mr. Knox will challenge everyone in sight to an idiosyncratic game of darts in the hall. Where other great seniors hang Presidential photographs in their den, he keeps by him an enormous lapel button that identifies him as "Yale, Class of 1920: Shorty Knox." Nor does he refer of his own account to something that an informed person can see for himself: that in the space of a single generation he has maneuvered the Albright-Knox Art Gallery into a place of honor among the top ten of American museums.

New-wing exhibit includes, beginning at left with Marisol sculpture, James Rosenquist, Robert Indiana, John Chamberlain, Robert Rauschenberg, Richard Stankiewicz, Ellsworth Kelly, Frank Stella.

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At a time when simply retaining interior space is a challenge, Lincoln Continental has actually increased that space. Based on the EPA interior volume index, Lincoln Continental gives you even more room than last year. You'll find this an achievement both remarkable and comforting.

41% *improvement in EPA Estimated MPG over 1979.

41% *improvement in estimated highway fuel economy over 1979.

17 **EPA EST. MPG.

24 EST. HWY. MPG.

*Based on comparison of standard engines.

**Compare this estimate to the estimated MPG of other cars. You may get different mileage depending on how fast you drive, weather conditions and trip length. Actual highway mileage will probably be less than the estimated highway fuel economy. California estimates and percentages are different.

Automatic overdrive transmission standard.

The 1980 Continental Mark VI Signature Series 4-Door

Throughout the history of the Continental Mark, its originality of design has prevailed. That is still true for the 1980s. Yet so much is new. There is a remarkable new electronic instrument panel with a message center that literally communicates with you. And Mark offers electronic engine controls that manage five separate engine functions.

Also new are a fully automatic overdrive transmission and an electronic fuel injection system which help Mark VI achieve its dramatic increase in fuel efficiency over Mark V.

And this year, there is another new Mark, the four-door Continental Mark VI, for those who prefer the added convenience of four doors.

Continental Mark VI for 1980. New, yet unmistakably Mark.

Introducing 1980 Continental Mark VI. The unmistakable mark of style and craftsmanship.

The 1980 Continental Mark VI Signature Series 2-Door

Continental Mark VI has more headroom, hiproom and shoulder room–front and rear–than Mark V. And you'll find more leg- and kneeroom in the rear compartment, too.† So, while meeting today's demands for more efficient fuel utilization, Mark VI still meets your personal need for comfort. Your need for more luggage space is met, too, with a deep-well trunk that gives you nearly four cubic feet more volume than last year.††

41% *improvement in EPA Estimated MPG over 1979.* **41%** *improvement in estimated highway fuel economy over 1979.* **17** **EPA EST. MPG. **24** EST. HWY. MPG.

*Based on comparison of standard engines.
**Compare this estimate to the estimated MPG of other cars. You may get different mileage depending on how fast you drive, weather conditions and trip length. Actual highway mileage will probably be less than the estimated highway fuel economy. California estimates and percentages are different.
†Based on 1980 MVMA dimensions. ††Based on EPA interior volume index.

Automatic overdrive transmission standard.

252 MILES TO EMPTY	✓ OK BRAKE PRESSURE	✓ OK HEADLAMPS	✓ OK BRAKELAMPS	✓ OK ENGINE TEMP	✓ OK ALTERNATOR	✓ OK WASHER FLUID
3:17 PM JUL 06 FRI	16 AVG MILES/GAL	36.8 ELAPSED MILES	0:12 ELAPSED TIME	30 AVG MILES/HR	54.0 MILES TO DEST	5:05 PM ETA

The Continentals bring to the eighties a fabulous collection of electronics that adds even more enjoyment to the experience of luxury car driving. Standard on Continental Mark VI and optional on Lincoln Continental is an electronic instrument panel that displays an impressive array of information on its exotic message center.

An integral part of the electronic instrument panel is the message center. You request information by pressing the appropriate button on the keyboard. The response is displayed instantly on the message center. Shown above, the system gives you such trip log data as average distance per gallon, distance traveled, elapsed time, average speed, distance to destination and estimated time of arrival.

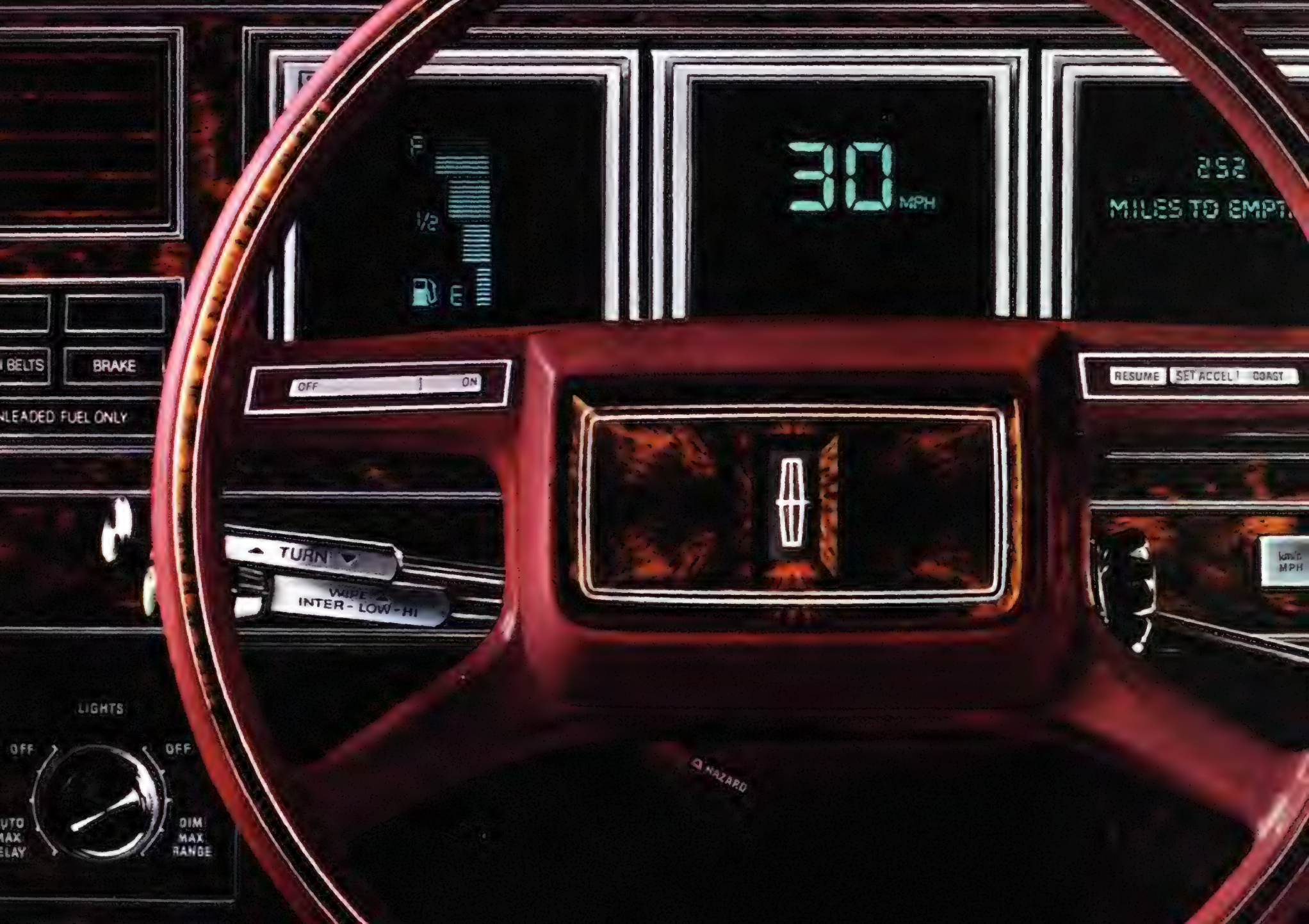
In addition, a systems monitor, through a warning tone and readout on the message center, alerts you to eleven different vehicle functions at the touch of a button.

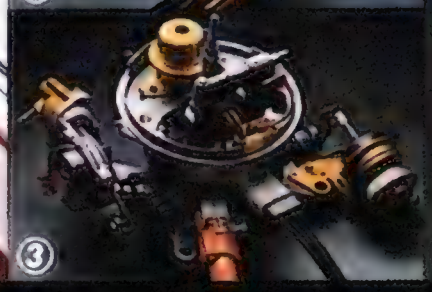
(1) An optional Keyless Entry System is available on the new Continentals. Using your personal five-digit code, simply press the appropriate buttons located on the outside of the driver's door. Doors and decklid will unlock automatically. The system, which can be bypassed with a key, also provides power door locks and illuminated entry.

(2) Standard on the Continentals is an electronic engine control system. The system uses an on-board computer and a number of sensors that provide an efficient balance of spark, air and fuel ratios, and exhaust recirculation.

(3) For precisely controlled fuel metering, electronic fuel injection is featured on all Continentals equipped with the standard 5.0 liter V-8 engine.

An electronic instrument panel that answers 20 different inquiries. What more could you ask of a luxury automobile?





④ *Another welcome feature of the Continentals is the increased trunk space. These new, deep-well trunks have greater luggage capacity over last year. Both Mark VI and Lincoln Continental give you 22.4 cubic feet of trunk volume.*

Now the Continentals offer a no-cost, three-year, limited corrosion perforation warranty. This warranty excludes exhaust system components. There is no mileage limitation. Your dealer has full details.

The Mark of the Designers, 1980.

Ralph Destino presents a look of exquisite jewelry and continues the Cartier legacy of soft-spoken elegance.

The Cartier Designer Series Continental Mark VI.

The statement of America's Bill Blass is fluid, sporty and topped with a Carriage Roof that recalls the classic convertible.

The Bill Blass Designer Series Continental Mark VI.

Hubert Givenchy, the renowned French designer, creates true high-fashion glamour, expressed with new strength and authority.

The Givenchy Designer Series Continental Mark VI.

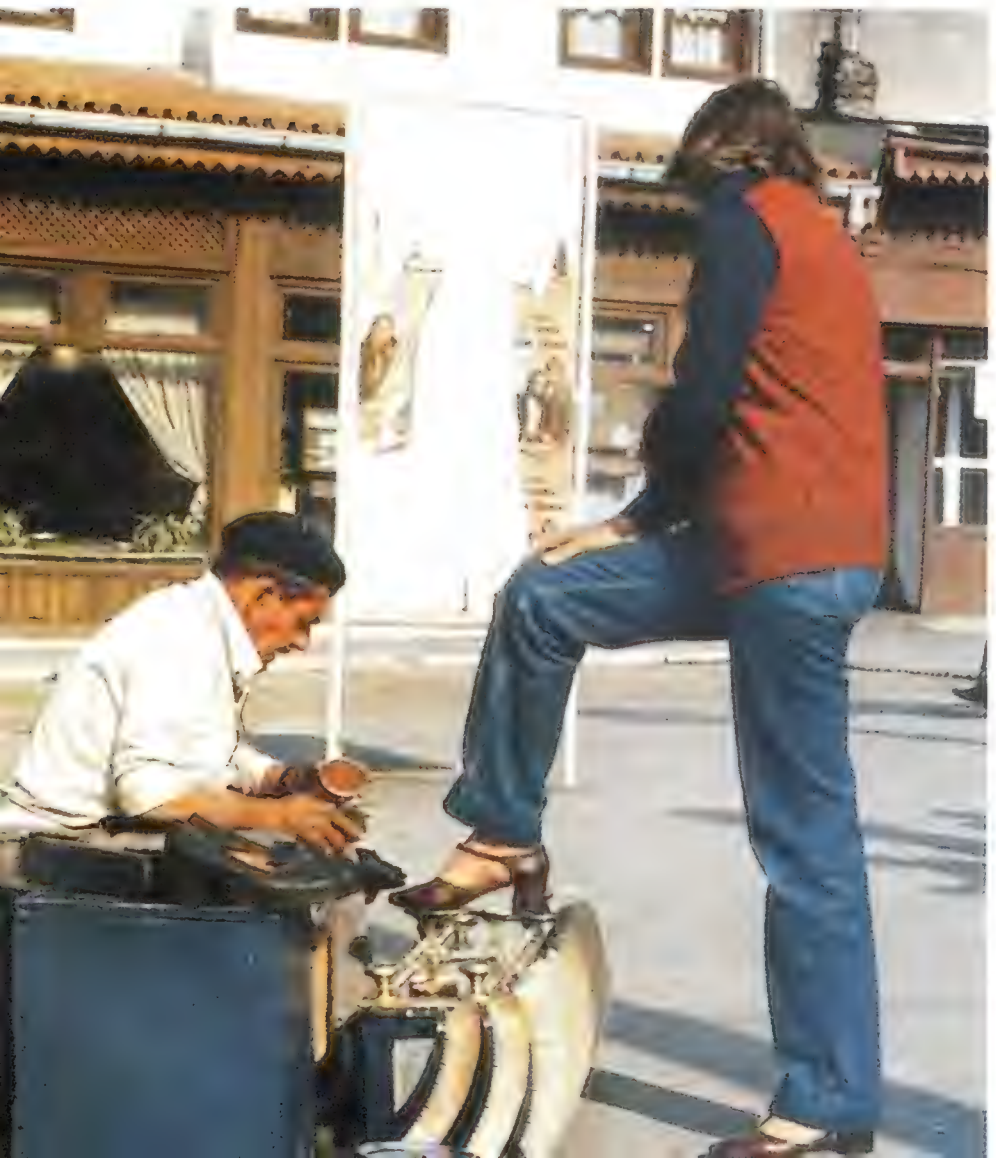
Italy's Emilio Pucci takes the leisure look to its ultimate possibilities with his cool, casual tone-on-tone design.

The Pucci Designer Series Continental Mark VI.

THE CONTINENTALS

LINCOLN-MERCURY DIVISION Ford

Sarajevo, 1950: A Muslim woman lifts veil to shine shoes for a male. Today (below) the veils have been replaced by jeans; and a pair of modish shoes are being polished by a man.



Article and photographs by John Phillips

Yugoslavia's old images become bright and shiny

Sedans, color TV sets and rock albums all make an old friend feel like Rip Van Winkle—but here are Partisans of yesteryear as they are now

I was the only passenger completely at a loss when we landed at Zemun. The name was familiar to me, but not the airport surroundings.

"You're in the *new* Zemun airport," I was told. Old Zemun had been swallowed up in a gigantic building spree. After a 23-year absence from Yugoslavia, I found it difficult to reconcile what I now saw with my memories of the past.

In 1947 Zemun was a community on the rim of a sandy wasteland called New Belgrade, across the river from Belgrade proper. In New Belgrade the government decided to build a hotel, the Yugoslavia. It was to be "representative" of the new era the country had just entered. Battalions of teen-agers marched to the construction site accompanied by martial tunes and fluttering flags. There they toiled until a critical shortage of building materials brought work to a halt, leaving a forlorn concrete skeleton in the middle of nowhere. That was my last recollection of the "representative" hotel and New Belgrade.

Now, as we drove through New Belgrade along a six-lane highway stretching between high-rise buildings, I felt like Rip Van Winkle, bewildered by what he had awakened to. There was one imposing structure, for example, consisting of two independent edifices linked together some 30 floors above street level

John Phillips was a writer-photographer for Life *in World War II and became a friend of Tito. He is producing a book of Yugoslavia photographs.*

by a double-decker bridge topped off by a circular revolving restaurant.

In addition to such office and government buildings New Belgrade has a spectacular housing complex locally called "the dormitory" since it is home for a quarter of a million newcomers attracted to Old Belgrade. There is no comparison between the dormitory, with its parking lots, schools, supermarkets, movies and hospitals, and similar projects I have seen in Moscow. The Yugoslavs build better, have a greater feel for city planning, tend to put rosebushes and petunia beds on balconies and curtains in every window. And the Yugoslavia hotel boasts 557 air-conditioned rooms, a casino, an indoor pool, an outdoor beach, gym, sauna, espresso bar and "butik" where you can pick up a bottle of Christian Dior perfume or a copy of the *Wall Street Journal* the day after it appears on the newsstands in New York.

Old Belgrade has changed little. Near the Kalemegdan Gardens you can still see turn-of-the-century residential apartments, their facades pockmarked by the gunfire of the Liberation. They peek out from behind narrow tree-lined streets, which until recently were cobblestoned.

I got a room at the Hotel Moska, where I had stayed after the Germans were driven out of Belgrade, and gazed down on the traffic along Terazije, Belgrade's Fifth Avenue. The steady flow reminded me of the days when there were so few cars around that Art Buchwald in one of his columns advised the Yugoslavs to "export their parking lots." The Zastava automobile plant in Kragujevac produces 900 cars a day—more than you could see in all Yugoslavia before World War II.

On the buildings across from my hotel gaudy neon signs lit up the night, advertising consumer goods.

Serbia, 30 years ago (at the left): horse-drawn carts laden with farm produce jam a village market.

Today (above), workers' autos fill parking lot at Zastava works, which rolls out 900 cars each day.

I could see the apothecary's, where in the old days you could not fill a prescription. Now you can, and the place advertises Coppertone sun lotion. The once-dreary department store half-filled with shoddy goods now displays two window manikins in well-cut suits sporting 35mm reflex cameras made in East Germany. Popular rock albums are on sale down the street. Neighborhood hotels, restaurants and rent-a-car companies accept American credit cards.

The changes in Yugoslav life are as unexpected as those in architecture and the shopping areas. In the wake of a devastating war the entire economy had been overhauled by collectivization of land and nationalization of industry. An extremely ambitious five-year plan found itself thwarted by an economic blockade imposed by the Soviet Union and dutifully observed by Eastern Europe. The Yugoslavs did without for years. I can still recall a saying: "I'm glad to make sacrifices for my son and my baby grandson, but I can't be expected to make these same sacrifices for an unborn great-grandson."

Today, it seems to me that the nation has achieved a level of affluence no one could have deemed possible a quarter of a century ago, an affluence unmatched in any other Communist state. You can gauge it in the number of privately owned cars on the road including such foreign makes as the Mercedes, and in the high number of color TVs, refrigerators and freezers in homes. Yugoslavs now take summer vacations, either staying at hotels on the Dalmatian coast or traveling abroad. "I find Greece much cheaper," one Yugoslav told me, while another remarked he "always wanted to take the family to see Venice."

The clincher is the fulfillment of a Yugoslav dream: an increasing number of people can afford a small weekend house. Dozens of partly completed houses

Winter, 1944: Vera Dedijer, just out of jail, cranks out pamphlets at Yugoslav mission in Italy.

dot the banks of the Danube 40 miles from Belgrade at Krcedin. On a weekday you can't even find a house cat at Krcedin but, come Saturday morning, almost every dream house has a Zastava parked outside the front door.

Curious to find how such changes had come about, I turned to an old friend, a retired ambassador. He took his son as an example: "To begin with, my son refused to become a diplomat," he said, "because 'there's no money in diplomacy'. He did work for a Yugoslav export firm abroad, but gave up his job. He had figured out that if he returned to Yugoslavia, and his wife also took up regular employment from 7 A.M. to 3 P.M., and then both moonlighted after hours, their combined earnings would give them a standard of comfort they couldn't afford abroad. It's that simple."

The director of the Excelsior Hotel in Dubrovnik put it this way: "Just compare Yugoslavia and Romania. The Yugoslavs are rich but Yugoslavia itself is poor, while Romania is rich and the Romanians are poor. Why are we rich? Because the pay is good and we hold down several jobs."

What did he consider good pay? I asked what a qualified worker at the Zastava auto works earned per month. "Four to five hundred dollars," I was told. If you consider that rent generally comes to around $20 a month, this allows workers to indulge in fancies usually considered middle-class. "I'm what you'd call a member of the 'red bourgeoisie,' " a retired revolutionary on pension beamed.

Yet Yugoslavia remains a Socialist state. What confuses a foreign visitor is that it is not only very different from any other Socialist state but also markedly different from what it used to be. Pragmatic Yugoslav Communists are willing to try anything new provided it does not violate their own concept of socialism. This startles foreigners. It comes as a shock to hear Yugoslavs discuss supply and demand. An American journalist, unable to come up with a definition of this brand of socialism, was heard to sigh, "It's Tito's great 'what-is-it?' "

The great "what-is-it" has undergone considerable change since my last trip to Yugoslavia. Collective farming along Soviet lines proved disastrous and has

Mosa Pijade, who served a jail term with Tito in the 1920s, became a Communist "elder."

Now in her Ljubljana apartment, Vera (left) visits with daughter, who studies in New York.

Mirko Lokar, being held by a freedom fighter (above), was taken from an Italian jail by his escaping mother when three days old. Now he supervises the production of bottle caps.

been phased out. Today most land is privately owned. No individual can buy more than five fertile acres; he cannot hire outside help. However, farmers can purchase any implements they require even if they have to spend foreign currency to do so.

In Serbia, I visited a vegetable farmer who annually produces eight flatcars each of tomatoes and water-

Now Mosa's statue, preserving his puckish smile, adorns Makedonska street in Belgrade.

melons, among other things. What most struck me about his two-tone farmhouse was the decor—large floppy dolls propped on the beds, stuffed pheasants in glass display cases, a papier-mâché gondola. Guests were served Johnnie Walker Red Label, a Serbian favorite, and Kent cigarettes. My host explained that the ancient tradition of investing in gold ducats which wives threaded into necklaces had died out in the past five years. Now farmers go in for such things as his huge color TV set, bulky refrigerator and oversize food freezer.

Sarajevo, in Bosnia, is a good place to observe the changes which have come over the country's lesser-developed sections. In 1949, the University of Sarajevo established an engineering course and Markin Ognjeslav, a Muslim, enrolled as student number four. Today he is working on the architecturally-acclaimed Skenderija project, a modern building complex encompassing almost everything: convention hall, theater, art galleries, several auditoriums, restaurants and a basketball court.

One of the most important dates in recent Yugoslavian development is 1964, when the government decided to allow Yugoslavs to emigrate and seek work abroad. By allowing citizens to leave, Tito radically altered the complexion of Yugoslavia and took the first steps to turn his country into a consumer society. By sending more than a million unskilled workers to Germany, Yugoslavia not only started receiving much-needed hard currency, but could look forward to the return of skilled workers. Many worked in Germany's hotels and restaurants, learning how to serve as the trained staff of hotels which were springing up along the Dalmatian coast.

Not all of these *gastarbeit,* or "guest workers," went to work for large hotels. A number started their own businesses. On the island of Hvar I came across a small café where the espresso would have delighted a Roman, while the ham sandwiches would have satisfied the most demanding Frenchman. "I learned the business in Saint-Tropez," the owner told me.

Among the millions of Yugoslavs seeking employment abroad it was inevitable that a number would display managerial talents. I know of a quartet who

Belgrade, after liberation: Salesman guards meager stock of long johns, shoes, gloves. Today (right), a Serbian knitwear company stages fashion show for diplomatic corps.

Slovenia, 1944 (top): actor-Partisans stage a liberation drama with Nazis only ten miles away.

Now (below), polished Belgrade company portrays the defeat of Bulgarian fascists in World War II.

Partisan headquarters (left): a 14-year-old courier, awaiting orders, darns sock on grenade. Now a retired lieutenant colonel (in plaid shirt at right), he plays boccie with a crony at Ljubljana.

worked in a ready-made clothing factory in Germany. Well-heeled, they returned home and convinced the mayor they had the know-how to run a plant themselves. Would he help? Would he! Today this factory employs more than 70 workers and supplies department stores. The company is "self-managed"—a representative of every department on the workers' council participates in the decision-making. The system gives the worker the feeling that he has a stake in the company.

I first met Tito at his headquarters on the island of Vis in July 1944. He lived in a cave on the highest point of the island, accessible only by foot. From here he could gaze across the Adriatic toward the Yugoslav mainland and the harbor of Split, some 35 miles to the northeast. He also overlooked Brigadier Fitzroy

Southern Italy, 1944: Lt. Col. Sergei Makiedo works at a palace desk arranging smuggling of supplies past Germans. On the island of Hvar (above) he retired, a former U.N. ambassador.

Maclean's Allied Mission to the Yugoslav Partisans, the British and American commando troops along with his own troops.

My first glimpse of Josip Broz Tito was through half-drawn tarpaulins which partly hid the entrance to the cave. Tito was seated at a table going over reports. At 52 his hair was straw-blond lightly streaked with white. His face was drawn and marked by strong lines which cut across his cheeks. Although it was a stifling July day he wore a heavy winter uniform. (I later learned he had nothing else to wear.) The heat did not appear to bother him. Neatly arranged on the table in front of him were a variety of colored pencils, a ruler, a magnifying glass and a pair of binoculars, the latter a gift from the Soviet field marshal, Ivan Stepanovich Konev. Tito looked up at me. Clear blue

Left: Major James Goodwin, American officer at Tito's Allied Mission in Slovenia, talks with Tito's son Zarko, who lost an arm fighting with Soviets in bloody battle near Moscow.

Now a Long Island exporter, Goodwin, who parachuted behind the enemy lines, talks with grandson Chris Wade, 14, junior high quarterback. Zarko now lives on pension.

eyes gave his strong, handsome face a cold detachment that vanished whenever he smiled. I had expected to meet a revolutionary but found myself confronting a chairman of the board (right).

Today he lives in a flat-roofed, two-story house in Zagreb which contains a darkroom where he makes his own prints. His extensive garden affords him a good half-mile walk along a path which borders the lawn. As I walked with him, he would stop several times to draw my attention to a statue or some newly planted sapling which stood out from the wide variety of evergreens that form a hedge. In the hallway of his house is a stuffed bear. "I have got a lot of bear," he says.

Adriatic island of Zis, 1944: Marshal Tito runs Partisan campaigns from his headquarters in cave. Zagreb, 1978 (below): at 86 he walks toward villa.

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Mumm's the word.

For 150 years, people who know how to live have been celebrating life with Mumm premium French Champagne.

NEW HAVEN
ANTI-ARSON PROGRAM
Developed by the Fire and Police Departments and the Mayor's Office.
SUMMARY:
1. At Risk Properties identified and monitored by computers.
2. Anti-Arson Task Force to operate as primary deterrent force for detection
3. Tougher claims procedures
remove incentives for arson
city supervision
criminal

How many arsonists in your city don't want you to read this?

Arsonists would like you to go on thinking there's "nothing you can do to stop them." Because when people start doing something the results are inspiring.

In New Haven, Connecticut—a city where suspicious fires increased by over 400% between 1973 and 1976—a new anti-arson program is already paying off.[1] A $175,000 arson-for-profit scam was broken up, and the man convicted won't be burning any more buildings where he's going for the next 3-7 years.[2]

New Haven's program also calls for potential arson-for-profit buildings to be identified by computer—a preventive measure to save the inner city of New Haven.

Can your city fight arson as successfully as New Haven? Ætna says you can.

We're developing pilot anti-arson programs, spreading information, and tightening up our own claims procedures.[3]

Ætna also supports fighting fire with legislation. The recent congressional classification of arson as a crime on a level with murder is just a start. The proposed Anti-Arson Act of 1979 goes further...it puts federal law enforcement tools in the hands of state and local governments.[4]

Arson cost over $1-billion and 700 lives in 1977. It's a crime we all have to pay for. Don't underestimate your own influence. Use it, as we are trying to use ours.

Ætna wants insurance to be affordable.

[1] New Haven is but one example of organized anti-arson efforts proving their worth. Seattle, Washington has reduced arson by 30%; *Tampa, Florida by 47% in just two years!*

[2] New Haven's crack Arson Squad is made up of city investigators, prosecutors, and the police and fire departments. Cities with divided anti-arson forces all too often fail to detect or convict the culprits.

[3] Ætna is supplying funds to establish two model anti-arson programs: for New Haven ($97,000) and for the California District Attorney's Association ($140,000) to develop manuals for national distribution on how to prosecute arsonists successfully. We've hired John Barracato, one of the nation's foremost arson experts whose credentials include Deputy Chief Fire Marshal of New York City, to coordinate our anti-arson efforts. To learn how you can help your city, write to John Barracato at Ætna Life & Casualty, Hartford, CT 06156.

[4] Connecticut recently passed some of the toughest arson laws in the country, and Ætna is working hard to get such laws in other states. This effort needs the help of every citizen.

Ætna Life & Casualty
151 Farmington Avenue
Hartford, CT 06156

Ætna
LIFE & CASUALTY

Pedaling to produce respiratory data, a patient at Columbia-Presbyterian Medical Center is monitored by canopy which records energy required to breathe. Measurements before and after biofeedback training show technique has helped some heart patients lower their energy needs for breathing by 20 percent.

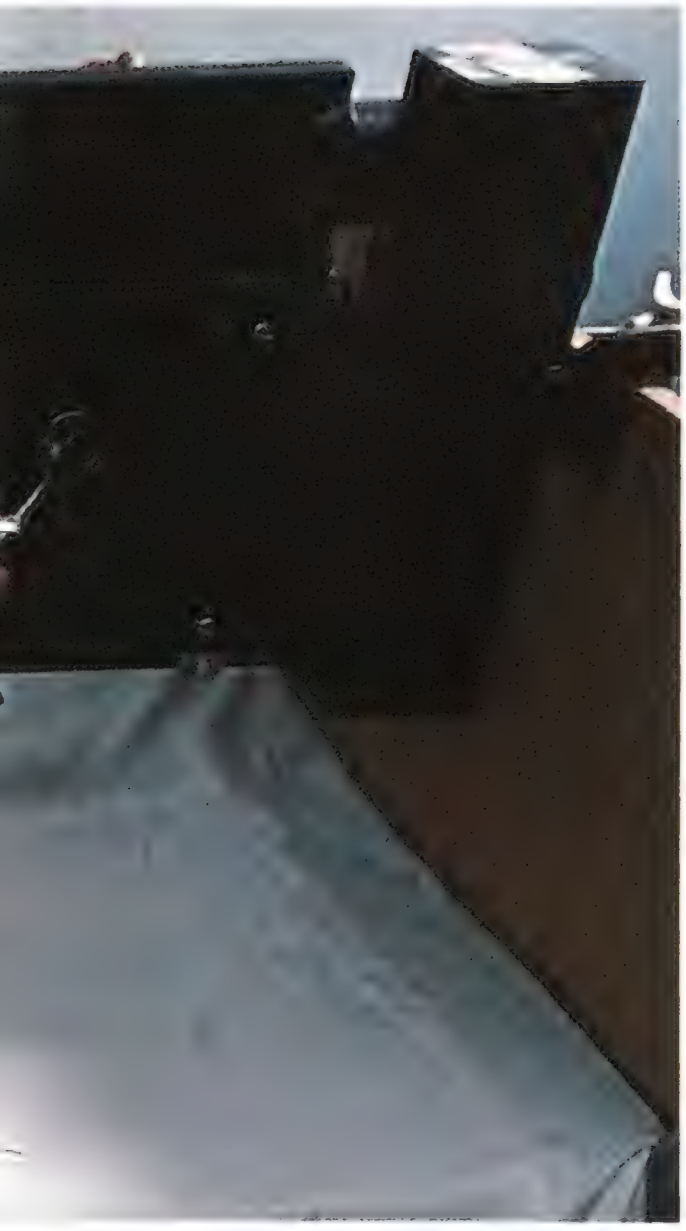
By Thomas W. Pew jr.

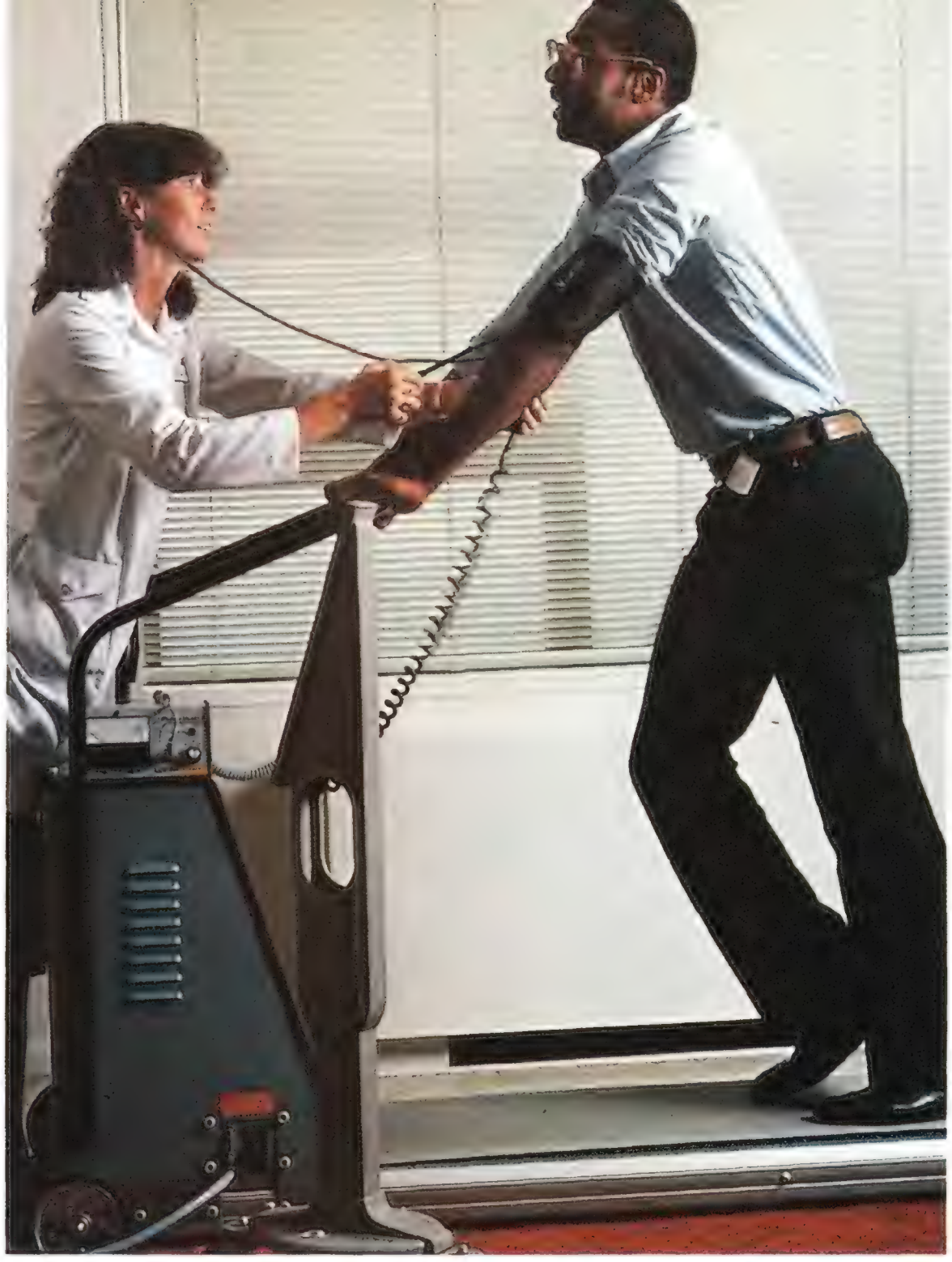
Biofeedback seeks new medical uses for concept of yoga

A principle employed by self-guided missiles like the Sidewinder helps patients track subconscious functions, try to regulate them

Keeping up with Dr. Kenneth Greenspan through the labyrinthine passages of the Columbia-Presbyterian Medical Center in New York City turned out to be an unexpected substitute for my morning jog. As I followed him down wide corridors, past stretcher-size double doors, up and down a disorienting array of elevators, I stuck my head inside a closet-size room for a brief meeting with intense researchers, listened to an inquiry about the comfort of a patient propped up in a hospital bed outfitted with some unusual looking exercise and monitoring devices, and took hasty notes in a computer room that looked more like the control center for operating a Minuteman missile silo than a medical facility.

This is how Dr. Greenspan usually begins his day at Columbia-Presbyterian, where he is assistant attending psychiatrist and director of the Laboratory and Center for Stress-Related Disorders. In his office, 30 floors above the Hudson River, overlooking the stress-related snarl of traffic trying to get on or off the George Wash-





A hypertension patient walks on treadmill, while biofeedback trainer takes his blood pressure.

ington Bridge, once again I found the inconspicuous little biological "listening" devices I'd been plugged into from San Francisco to Topeka in my quest for an understanding of biofeedback. Dr. Greenspan introduced me to his own research by flashing a series of slides on the office wall, including a color picture of himself, stripped to the waist, stretched out on a bed and attached to the exercise equipment and monitoring devices we'd just seen on our tour.

"I try everything on myself first," he explained. "How else can I feel what the patient is feeling?" The concept was a new one to me—a doctor trying his own treatment so that he could get closer to his patients.

Using slides of himself and one of his biofeedback trainers working with patients, Dr. Greenspan quickly laid out the ideas he believes underlie the success of biofeedback treatment at the Medical Center. "Patients come to us feeling like victims," he said, "sick and unsure of what to expect, and we try to help them develop an attitude of mastery. We share with them what we know, and we seek their active participation in their own treatment. The goal is self-responsibility for the maintenance of one's own health," he added, "and to assist the doctor within us."

Dr. Greenspan's description of patients as "victims" illustrates a concept that pioneer biofeedback researcher Dr. Barbara B. Brown calls the "second illness": a person may actually get a lot sicker from the stress of being sick and from the fear and anxiety that can accompany modern treatments—especially the trauma of hospitalization. Dr. Greenspan's practice of trying out on himself the equipment he uses on his patients, and his emphasis on the medical benefits of compassion on the part of the physician and his aides, could reduce the risks of "second illness."

While I was still chewing on these ideas, Dr. Greenspan showed me data on 22 patients whose treatment represents a provocative study of biofeedback's potential benefits. Most of the patients had been referred to Dr. Greenspan by Dr. Arthur B. Voorhees jr., chief

Color photographs by David Atie and Dan McCoy

Hooked up to banks of biofeedback instruments in his own lab, Dr. Greenspan demonstrates an array of monitors that can be used. Multiple images show the meters on which he can see his body's responses.

On a doctor's assistant, skin electrodes pick up electrical impulses which diminish as she relaxes.

of cardiovascular surgery at the medical center. When they first arrived, they could not walk from the hospital parking lot to the stress center—the equivalent of two city blocks—without pain. Their circulatory systems were choked with clots, their legs crippled from lack of proper circulation. In only three months of intense biofeedback training and behavioral therapy, in which these patients consciously learned to regulate the temperature in their legs, they were able to walk a mile on the laboratory treadmill without pain, and some changes in their cardiovascular systems were similar to those seen during athletic conditioning. Even a rudimentary understanding of the medical data before me showed changes that appeared to be beyond the explanations of the best modern treatments, especially in cases of this severity.

These patients were allowed to "see" or "hear" a problem in circulation and to find a natural method for solving the problem, aided in their "seeing" and "hearing" by a rigorous training program using muscle and temperature biofeedback devices on their hands and legs. While the patients relaxed in recliners, temperature information on their blood-starved limbs was monitored, amplified and relayed to them. By learning to raise the temperature of their limbs (which meant sending more blood to the affected areas), they gradually accelerated the development of collateral blood vessels around the clots. In effect, they developed a natural bypass system to the areas that previously had been cut off by the clots, restoring needed circulation to their crippled limbs. They also achieved deep relaxation and lessened the cardiac stress that often accompanied their efforts at walking.

I have experienced this type of biofeedback training at both the Biofeedback Institute in San Francisco and the Biofeedback and Psychophysiology Center at the Menninger Foundation in Topeka. Watching a large dial thermometer on the biofeedback instrument or listening to electronic beeps indicating temperature changes, I was soon able to raise the temperature of the part of my body to which the sensor was attached. When I saw the temperature start to go up—usually after a few moments of relaxing—I just "went with" the feeling that accompanied it, and the temperature continued to rise. It was quite easy to achieve. Most of the other participants at a Menninger biofeedback workshop found it the same. Interestingly, for those who insist that no such thing will happen when they are attached to temperature trainers, the thermometer will often remain stationary or actually fall when they attempt the training. To biofeedback researchers this only underscores the importance of motivation, and further serves to show that the body tends to do what we visualize—negatively as well as positively.

Dr. Elmer E. Green, founder of the Biofeedback and Psychophysiology Center at Menninger's, who previously worked as a physicist analyzing the performance of self-controlled guided missiles at a naval ordnance test station in California, pointed out that biofeedback uses an approach to self-regulation in human beings similar to that employed by such missiles as the supersonic heat-seeking Sidewinder. The Sidewinder homes in on the target aircraft by detecting heat from the engine exhaust and transmitting that information to a computer which uses it to constantly adjust the missile's flight controls.

Biofeedback, Dr. Green said, means getting immediate, ongoing information about one's own biological processes or conditions—such as heart behavior, temperature, brain-wave activity, blood pressure or muscle tension—and using the information to change and control voluntarily the specific process or response being monitored.

Once the signals are heard or seen an individual is able to influence their direction by willpower. "We don't know how visualization and volition get con-

The author, a Tucson-based free-lance writer, wrote on Baja California in the January 1976 SMITHSONIAN.

verted into action," Dr. Green told a workshop of doctors and counselors at Menninger's, "but we don't need to know everything in order to use biofeedback."

Yogis and similar individuals in many societies learn or seem to possess naturally the same self-regulating abilities the average person can acquire relatively quickly through biofeedback training. In their 20-year study of the mechanisms of biofeedback, Dr. Green, with colleague and wife Alyce M. Green, studied yogis and others with unusual control over their minds and bodies, traveling from the Menninger laboratories in Kansas to the banks of the Ganges River. What they found and documented on a sophisticated array of electronic instruments was that there are people who are conversant with the most subtle workings of what we in the West call the autonomic or involuntary nervous system.

Some yogis can alter their heartbeats on command (starting and stopping fibrillation, for example). They can alter their respiration rates, apparently enabling them to enter a kind of hibernation for long periods of time, and they can produce a whole range of brain waves, changing them at will. In addition they can exercise control over the temperatures of their bodies, stand extremes of environmental temperatures, and they seem able to make themselves impervious to pain.

One of the most impressive people ever studied at Menninger's is a Netherlander, Jack Schwarz. Participants in the biofeedback workshops are shown a film made in the laboratory there in which Schwarz runs a large, rusty sailmaker's needle through his upper arm while his body's reactions are closely monitored by a bank of electronic instruments designed to detect the slightest response to this ordeal. Just watching the dull, unsterilized needle puncture the soft flesh and be forced through the biceps with heavy pressure, finally to pop out the opposite side of the arm preceded by a great pointed bulge in the skin, was enough to raise my own blood pressure, increase my heart rate and make the moisture content of my skin leap. From the uneasy squirms and fidgets in the auditorium around me it was obvious that others watching the demonstration were reacting as I was.

Meanwhile, there was Jack Schwarz on film (below) calmly carrying on a conversation with a slightly incredulous-looking Elmer Green. After Dr. Green was satisfied that he had all the readings he wanted on the instruments, Schwarz began withdrawing the needle from his arm. The tissues inside the arm were clinging to the metal because as the needle was withdrawn the flesh was pulled far out like bread dough.

I had heard of this demonstration prior to seeing it at Menninger's but I had no idea of the size of the needle and had not realized it was run completely through the arm. At the final moment the camera zoomed in to concentrate on the point where the needle was slipping out of Schwarz's arm. As it emerged, the hole could be seen closing instantly, allowing no more than a drop of blood to run down the skin. Within a matter of hours the wound had completely healed and the flesh exhibited no bruises, needle marks or signs of internal bleeding. Furthermore, none of the instruments recording Schwarz's heart and respiration rates, galvanic skin response, hand temperature and brain-wave activity showed he had experienced pain.

Schwarz has repeated this demonstration of control over pain and healing many times in the presence of medical doctors. One witnessing physician attempted

Frames from film made at Menninger lab show Jack Schwarz wired with electronic instrumentation.

to repeat the Schwarz demonstration himself. He had to halt in the middle, overcome with pain, but Schwarz coached him through the rest of the way by telling him to close his eyes and "think about the jonquils" blooming outdoors. Unfortunately the doctor could not control the bleeding and was left with a heavily bruised and sore arm for several days.

In spite of this evidence—open to investigation by any serious researcher or physician—the documented abilities of people like Jack Schwarz (and even of average individuals to control and alter functions in their autonomic nervous systems through biofeedback training), many doctors who went through medical school more than a decade ago still find it a difficult concept to accept. Several doctors at the Menninger workshop admitted that the idea of the inviolability of this nervous system had been so thoroughly drummed into their heads in medical school that they felt a strong involuntary resistance to accepting what they were hearing and seeing (as well as experiencing).

Almost everyone has at some time in his or her life been hooked up to some of the more obvious biofeedback equipment. A simple blood-pressure cuff can be used for biofeedback training, as can an electrocardiograph, and even, as in Dr. Greenspan's work, a thermometer. In traditional medicine, the information produced by these biofeedback instruments is primarily for the physician's eyes and his use. In biofeedback training, the diagnostic or feedback instruments are primarily for the patient's information. It's up to the patient to use the information—whether it tells about heart rate, blood pressure, temperature, muscle contractions or brain waves—to help restore normal functions to the body. And how does anyone do this?

If you are doing your biofeedback training at Menninger's under the guidance of Dr. Green, he will tell you to "visualize what you want the body to do. Tell the body to do it. Then relax and let it do it." Then something changes in the body, and the biofeedback instruments show that change. And with a little practice, when the patient sees the change and realizes that he or she does have an observable physiology, then the patient is on the way to self-regulation.

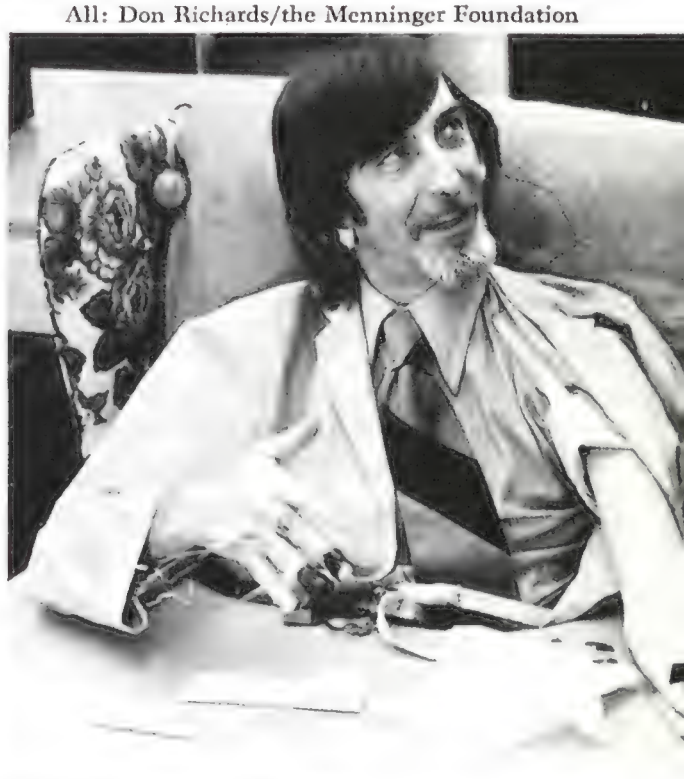
The remarkable thing that follows the instruction is the rapidity with which many people "get it," learn to "play" their biofeedback instrument, and advance from being mere observers of the workings of their autonomic nervous systems to being able to exercise their will over it. Biofeedback itself, Alyce Green pointed out, "does nothing *to* the person." It is only "a tool for releasing potential."

No amount of conscious effort usually works in learning biofeedback. The trick is just to listen to the feedback signal and when the changes you want begin, "go" with that feeling. "There is another way to say it," advised Dr. Green: "the person visualizes and feels the desired change that will influence the meter, and allows the body to carry out the instruction. The feeling seems to be the instruction. This feeling has been reported by many successful performers to be, at least in the early stages of learning, a composite image, emotion and body sensation, but after a skill is thoroughly learned, the body sensation can be 'turned on' at will, often with no need for any particular men-

All: Don Richards/the Menninger Foundation

Inserting sailmaker's needle into arm, he shows no signs of pain.

Needle penetrates a half-inch deep in muscle—through biceps.



Once removed, the needle leaves no trace of wound, and little blood.

Tom Kieffer

Monitoring the physiology of a yogi sitting on a bed of nails, Dr. Elmer Green extends his Menninger

tal image or emotion. Often feedback is not needed for more than a few weeks. Most important, biofeedback is not addictive because voluntary internal control is established, rather than dependence on an external agency.

"The point is we're used to having the voluntary muscles of our body do what we visualize. And you don't have to understand the body to make it work for you," Dr. Green said, "any more than you have to know the mechanism of a car to drive it. In teaching control of 'involuntary' body processes, we explain the neuromechanism to patients to get them over their sense of something outside themselves being in control. The rest is up to them."

Not all biofeedback practitioners are as sanguine about the medical miracles biofeedback can achieve. Dr. DeLee Lantz, a clinical psychologist and until recently acting director of the Biofeedback Institute in San Francisco, believes it may be possible for biofeedback trainers to "cure" migraine headaches, but there's not enough clinical evidence to know yet. Dr. Joseph D. Sargent, the chief of internal medicine at Menninger's and in charge of the clinic's biofeedback headache research and training project, says biofeedback is no cure for migraine, only a way of "managing" the headache. Alan J. Tyler, a counselor and biofeedback trainer with the Associates in Human Development in Tucson, believes it is quite possible for patients to become dependent on the biofeedback equipment. He finds it is common for the old symptoms to recur when patients who have successfully used the training no longer get their weekly dose of reassuring feedback from the machinery and fail to practice their daily image-altering exercises.

Dr. Sargent has confirmed this experience with his migraine patients at Menninger's. "As soon as they withdraw attention from the task—in this case, increasing the blood flow in their hands," he said, "they return to the base line. The headache comes back. They've got to keep repeating the task, repeating, repeating." When boredom with the training sets in, some of his patients rationalize: "Why bother with this when I can take medicine instead?" They aren't willing to stick with the program; they would just as soon take a pill, and they say they don't worry about what the drugs may be doing to them.

Biofeedback is for people who are highly motivated, or who suffer unbearable side effects from alternative medication. It is not a panacea. "We will need drugs plus biofeedback," said Dr. Sargent, and he sees self-regulation being applied most successfully in skeletal muscle control for stroke victims and in relaxation techniques for those on Valium, Librium and other minor tranquilizers. He also believes it will be effective in helping treat many psychosomatic diseases caused by or related to stress. Physicians believe that 75 percent or more of modern disease is related to stress,

biofeedback research to India. Study was part of 1973 trip to investigate scientific basis for such feats.

Michael Mauney

Therapist Dr. Judith Green (daughter of Menninger pioneers) tries biofeedback on asthmatic child.

which makes biofeedback a potential tool for virtually all of the medical and psychological specialities.

A study made in a British factory threatened with a permanent closing illustrates the point. The study showed marked increases in workers' blood pressures, an increase which remained even among those employees who were never actually laid off. What had changed in the workers' environment was their sense of security, their image of themselves as valuable members of society. Even when they retained their jobs and the threat was past, their blood pressures did not return to the pre-threat, normal levels. What happens in cases such as this, according to Dr. Barbara Brown, is that "the problem-solving effort fills all the body's circuits, blocking off any other inputs. The natural, unconscious awareness of how the body is behaving is blocked off by the cortex when the person is under constant stress. Under normal circumstances the cortex would allow tension to relax, but in the context of the social system the cortex doesn't know how to relax. The tension is held and held, and pretty soon physical disease arises."

In the modern vernacular, such a person is "uptight" to the extent that something has to give. What reacts is blood pressure, lower back, head, stomach, legs, heart, any place in the body where the stress can be converted to disorder-creating tension.

Yoga, golfing, tai chi, running—all body-awareness techniques—are good for relieving stress, but when a person is ill (when there are actually blood clots in the legs, for example) there isn't time to learn yoga. This is where the accurate and sensitive biofeedback instruments come in. The individual can see that the hands are too cold, that circulation is being restricted, that muscles are too tight, that brain waves are racing, or that the stomach is too acid. These are typical stress-related symptoms known to almost everyone, and if allowed to continue without relief they can be precursors of serious disease. With the use of biofeedback training, many people can learn to alleviate them.

Even in instances of disorders that do not arise from stress, biofeedback has found the way to innovative cures. In a program at the University of Alabama Medical Center in Birmingham, deaf children have learned to speak more clearly by using a feedback device called a "palatometer." This visual biofeedback instrument shows the deaf child the position and shape of his or her tongue alongside that of a hearing person speaking the same sounds. Fifty to 100 sensors imbedded in a custom-designed plastic palate are activated whenever the tongue touches the palate. The positions of the tongue show up as white dots on a TV screen, showing the child an outline of where the tongue is located for a specific sound. He can match the position of his own tongue to that of the instructor. To the child who has never heard speech, it is another way of learning to talk.

Another impressive application of biofeedback has been found to help victims overcome "foot drop," a nerve injury which causes an impaired gait often requiring the use of leg braces. In still another application, some California schools have achieved dramatic improvements in children with problems of concentration, anxiety and hyperactive behavior. Often if a child—or an adult for that matter—can just learn to raise the temperature of his or her hands it affects all kinds of other problems. Once an individual sees that it is possible to control one thing, he realizes the potential to control other things—concentration or hyperactivity, for instance. In these cases biofeedback simply gives the individual a sense of self-control and mastery, something beyond the reach of "others."

The extent of self-influence can be impressive. Patients working with muscle biofeedback learned to reduce the electrical firing of nerves leading to the point where an electrode was attached to their skin, until only a single nerve cell was being triggered. Firing the one nerve at will, they could produce a drum roll or tap out a song on biofeedback audio equipment.

What biofeedback seems to be showing is that sometimes people have hidden abilities to deal with the kinds of stress they encounter in the modern world. The rapidity with which we can learn to use biofeedback makes this conjunction of Man and machine appear as a natural extension of our own nerves and muscles. Or perhaps biofeedback is just a reminder of something we've had all along but lost the ability to perceive and use. "In psychology," the Greens have written, "there has been a tendency to look on humans as 'king-size rats,' reflective only of genetics and conditioning. In medicine we have accepted the idea that the doctor must 'cure' us. In order to be made well we must undergo surgery, drug treatment, radiation treatment, or some other kind of manipulation by outside forces. We have not been informed that our bodies tend to do what they are told *if we know how to tell them*." If we can have psychosomatic illness, then why can't we have psychosomatic healing? asked Dr. Green. "You meet one of these guys who can do impossible things. It makes you think there is something to be learned about a person's ability *not* to be programmed solely by his genes and his conditioning. You *can* make a better life for yourself."

Relaxation exercise learned in biofeedback training helped University of Wisconsin (La Crosse) football team cut injuries. After training, team play improved from winning 60 percent of games to 90 percent.

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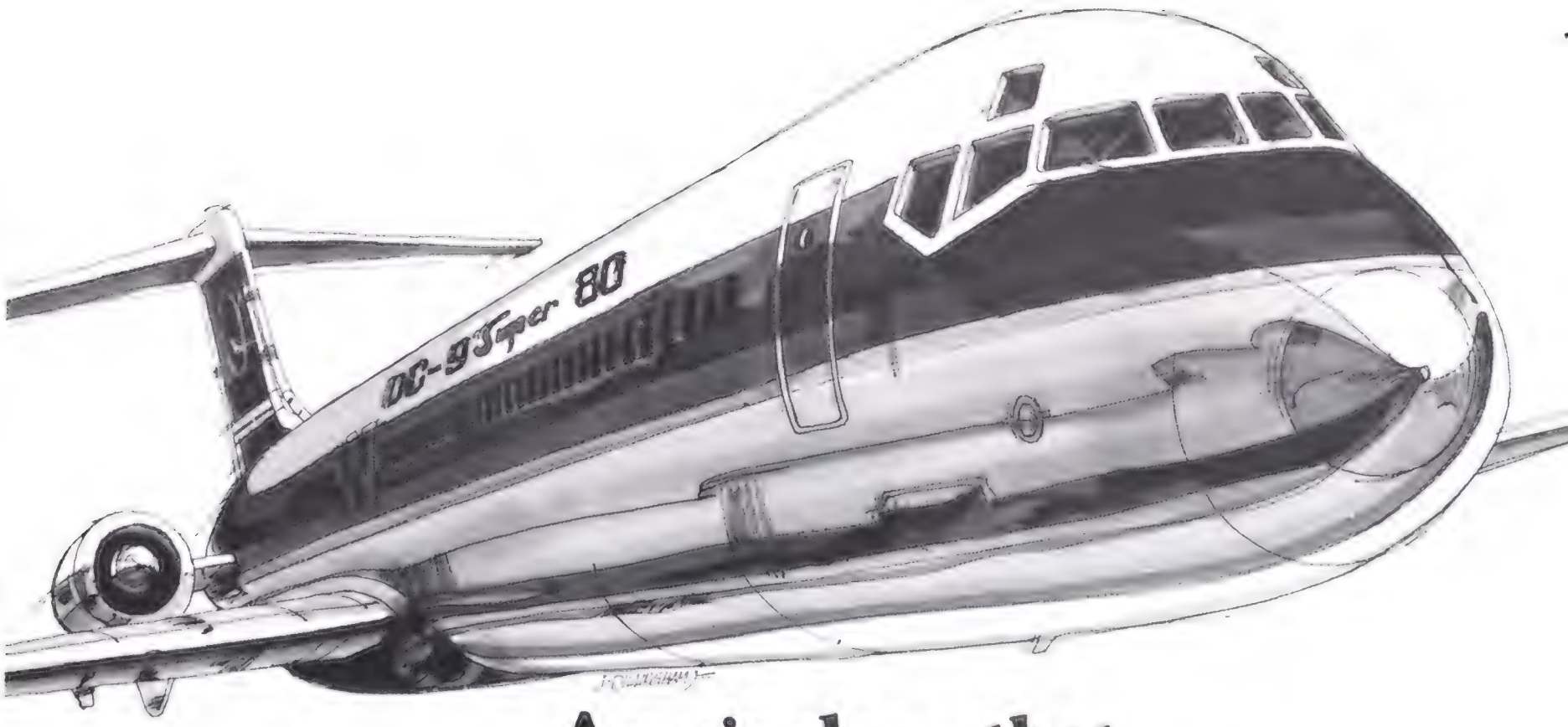

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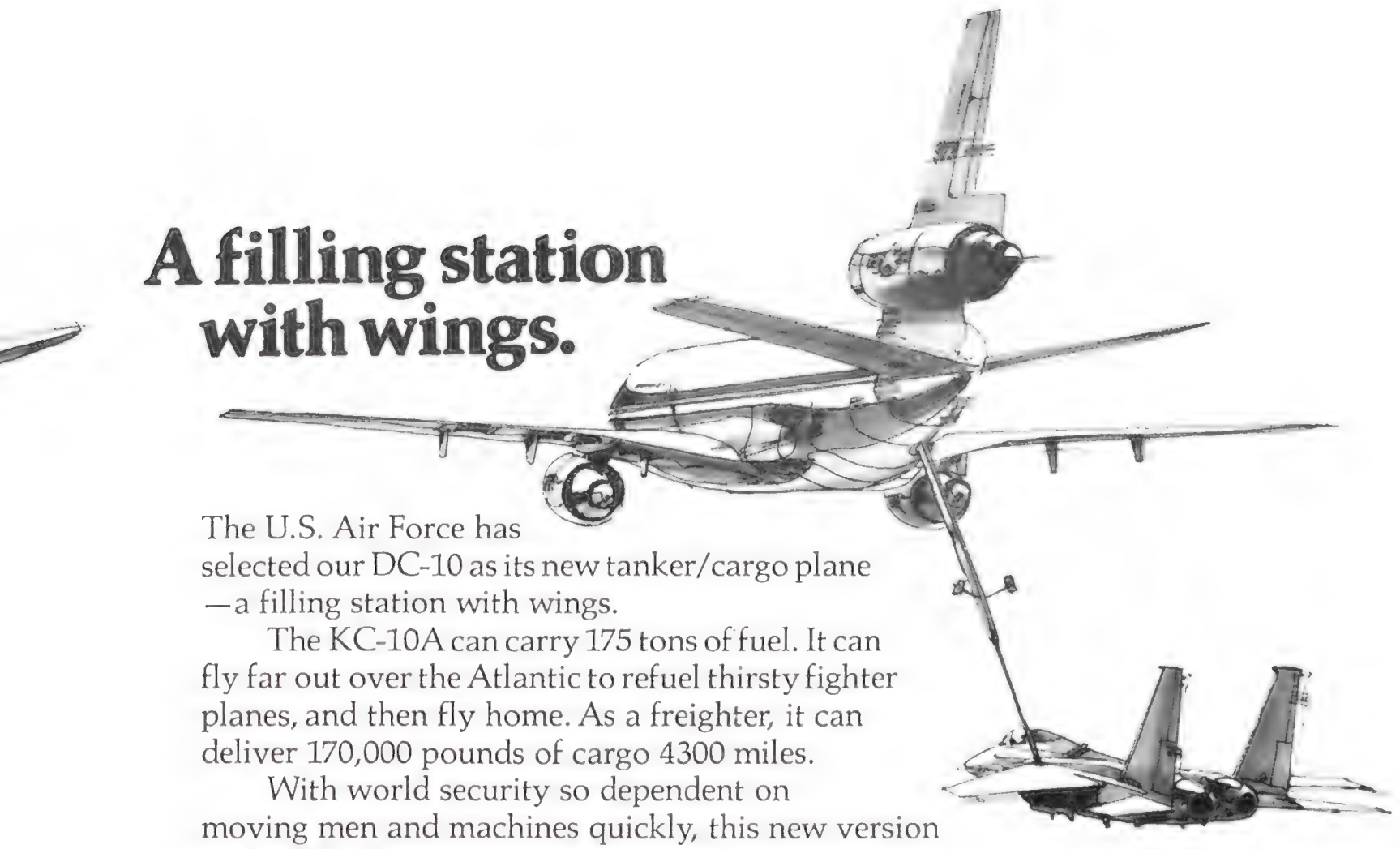

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Lewis Rems and Bill Ward "round up" llama on a ranch in Oregon near Three Sisters. Polish Arabian horses are prime exhibits here, but owner believes llama can become standard U.S. stock animal.

By Jack Fincher

Some immigrant llamas thrive in home of forebears

Their ancestors evolved in North America, and these symbols of the Andes seem to do well in New York, Oregon and California

Three-week-old llama testifies to breeding success in Oregon. The mother, foreground, is named Harriet.

"They make ideal pack animals," said Paul Miesner as we labored up a tilting field made boggy by the melting snows of Mount Shasta. "They don't beat up the trail. They're as light-footed as deer."

A yard or so abreast of us, Caboose and Cuzco, liberated for the day from the pasture they share with 18 other llamas in the little northern California town of Mount Shasta, had become as I had envisioned them: shaggy Ariels of the upper altitudes, floating at the end of their lead ropes like wind-blown balloons.

A little later our packtrain group—Paul, his partner Stephen Biggs, their friend Terri Clark, my wife Claire and I—paused on a sun-drenched hillside to eat a picnic lunch. The three told us about Shasta's reputation as a "magic mountain" where, legend has it, a subterranean people called Lemurians dwell and are sometimes reportedly seen in white robes or as a procession of eerie glowing lights wending down the mountainside in the dark of night.

Thinking of magic and legend, I glanced at Cuzco, a dappled brown male with a piquant face, tethered to a nearby tree. Cuzco, a name redolent of the Inca capital, where llamas once were sacrificed and omens read from their carcasses. Llamas and Shasta. It somehow seemed to fit, too. In a way, the llamas started here.

Ancestors of the llama evolved in North America, where their origins can be traced back to more than 40 million years ago. These ancestors were members of the camel family, collectively known as camelids, a family that was confined to North America until just before the latest Ice Age. More than two million years ago, camelids began to migrate out of North America. Some crossed the Bering land bridge into Eurasia, and later some emigrated down into South America. The South American forms evolved into vicuña (SMITHSONIAN, January 1977) and guanaco, from which the alpaca and llama were domesticated. The last of the remaining North American camelids died out in our Southwest toward the close of the Pleistocene, about 10,000 years ago.

North America was also the center of equid or horse evolution, but they, unlike camelids, were extinct in the New World by the end of the Pleistocene. Although horses had migrated from North America to almost every other continent by the close of the Pleistocene, the only ancestors of the domestic horse to survive into historic time were those in the Old World. The American plains and pampas, which proved to be ideally suited for the horses introduced by European

An Ashland, Oregon, free-lance writer specializing in science, Jack Fincher reported on research on sleep disorders in November 1978 SMITHSONIAN.

Photographs by Christopher Springmann

Llamas make a 'comeback'

Richard and Kay Patterson feed part of their herd. Llamas can live on as little as ten pounds of hay a day.

explorers during the 16th century, were barren of equid life when first seen by these men.

It was left to a pair of latter-day entrepreneurs to do the same for the llama. One of them was Roland Lindemann, a financier who had learned enough zoology from his professor father to set up a breeding preserve in Catskill, New York, during the early 1930s that now encompasses 1,260 acres. Lindemann acquired a dozen llamas and then let nature take its course. But another contemporary importer, in keeping with his bravura style, promptly went public with the beast. William Randolph Hearst collected on a grandly eclectic, well-publicized scale—a multimillion-dollar passion that in its heyday encompassed everything from a Noah's Ark of rare animals to Roman mosaic tiles and the Cardinal Richelieu bed. Along with other exotic ruminators, he thought llamas might be just the thing to browse the craggy California coastline of his fabulous ranch at San Simeon.

For all his celebrated prodigality, however, Hearst, like Lindemann, never imported llamas on a scale to concern anyone—except perhaps the Peruvian government, leery of sharing its unique national resource, and the U.S. Department of Agriculture, alert to the perils of foot-and-mouth disease. In 1930 a new law banned immigrant llamas, a ban that endures to this day. By then the Hearst herd that had modestly begun with three males and three females was, like Lindemann's, well established.

A New York herd heads west

After Hearst's death in 1951 the San Simeon stock went to his friend Lindemann, doubling his holdings and making him America's "king of the llamas." Two decades ago the combined herd, despite thinning by random sales, had reached 450 and had begun to pose a distinct population threat. Thus most of the llamas passed along to a young breeder of Arabian horses named Richard Patterson. It is Patterson and his wife, Kay, their own herd in Oregon since grown to surpass Lindemann's, who are making the first effort in this country to extend the llama's natural dominion—from the snow-clad peaks of the Andes to the richly varied terrain of a United States known to the llama's ancestors eons before Man.

In so doing they have shattered several myths. For instance, the llama's innate ability to flourish at high altitudes has long been perverted to mean it can't function at lower elevations. The llama's hemoglobin can take in more oxygen than ours, and the red cells that carry it last more than twice as long, yes. But the llama adapts to almost any environment, even at sea level. The reputation it shares with the camel for orneriness and spitting, moreover, is a bad rap more

Frolicking in their Oregon pasture, young males show every sign that, although they are adapted for living at high altitudes, they do just fine at lower levels, too. The Pattersons have a waiting list of purchasers.

justly laid on the doorstep of abusive owners. Llamas can spit, all right, but they normally don't.

The plain strangeness of this lovable Latin brute, its monumental unflappability, its endearingly bland refusal to exhibit any kind of herbivore culture shock, may stem from the same hidden wellspring of toughness as the camel's.

Patterson wouldn't know about that. But he does know his corner of animal husbandry—not only horses, llamas and camels but wallaroos and Watusi cattle. He says the durable llama could in time become one of the standard stock animals in North America—with one important disclaimer:

"Things I've said have been interpreted to mean that llamas are a great tax dodge. That's not true. You don't buy llamas as a tax dodge any more than you buy cattle. No one in his right mind is going to buy cattle unless he thinks the market will go up and he'll make a profit on it. You've got to feed them, hire labor, fertilize. Sure, if it doesn't work out you can write it off as a business loss, but you can do that with a Hula-Hoop factory, too."

But you can put a lot of kids through college raising llamas, he tells you. How? In South America, the llama is almost as bountifully all-purpose as Al Capp's schmoo. Peasants weave its fleece into cloth, fashion its hide into sandals, braid its hair into rope, and turn its tallow into candles. They often eat its meat, sometimes drink its milk, and always dry its droppings into *carbón peruano,* the "Peruvian charcoal" they scavenge as their chief fuel. But Patterson is talking about only two products: high-grade wool (though not in the quantity yielded by the alpaca or the exquisite quality of the vicuña) and more llamas.

"The wool sells for $32 a pound, compared to 75¢ a pound for sheep's wool," he says, "and you get on the average about five pounds a year from each llama."

Before you rush pell-mell into the llama wool business, let it be pointed out that Patterson doesn't know of a single major market in this country. When he queried one commercial mill in Portland, he found that, since the supply doesn't exist, neither for the moment does the demand. Once the one exists—he is confident it will—the other will naturally follow. In the meantime, he says, "there are enough home-grown, back-to-nature spinners around looking for something different that you can sell all you can shear just by running an ad in the nearest big-city newspaper.

"There's no question people want it. You should see them come along our fences with paper bags, collecting what the llamas rub off."

The Pattersons don't sell their wool. With 100 to 200 buyers usually on his waiting list for llamas and only 2,000 to be had, Patterson believes "llamas, not wool, are the crop to farm. The price has risen considerably. A breeding pair of six-month-old llamas now costs $4,000." The Pattersons will not sell them singly because, they say, few things in this world are sadder than a lonely llama.

Fully two-thirds of the 900 llamas the Pattersons have sold were for breeding, the remainder for pets and pack animals. A mature male can carry 80 to 90 pounds 20 miles a day for three weeks. *Can carry* is not the best way to put it; *will carry* is better. The pack mule has been said to pitch to its death from a high precipice, utterly exhausted from struggling with an impossible burden. Not the llama. It simply refuses to pack more than its self-determined limit. If overloaded it calmly lies down and doesn't budge, oblivious to threats and imprecations, until the offending freight is removed or lightened.

Patterson first became interested in raising animals while growing up in Ohio, where his father manufactured machine tools. He haunted zoos, and at 15

A packtrain through the California mountains takes a break welcomed by both humans and animals.

bought his first purebred Arabian. Later he earned a Bachelor of Science degree in biology (genetics) and a Masters in business administration. He bought his first "llamas" in 1958: "Actually they were guanacos, the llama's wild ancestor. I got three of them, a male and two females, from a zoo in Virginia. Finally had a nice little herd of 15 or 20." Despite nine years in the front office of the family business, there was never much doubt about what he wanted to do: breed fine animals in large numbers.

Kay agreed. The daughter of a Chagrin Falls, Ohio, physician, she had completed a premed course when she met her future husband. Soon after their marriage, his parents sold them the family Arabians. The guanacos were exchanged for llamas. Says Patterson, "they were bigger, longer-haired, more rugged, more varied in color and not so high-strung as guanacos. From then on it was a continual love affair. I was like an alcoholic. One zoo after another, like one bar after another." Especially the Catskill Game Farm, where Lindemann became, in Patterson's words, "our mentor, benefactor and teacher." A few years later, the Pattersons moved everything to the eastern Oregon community of Sisters, in the shadow of the three lofty mountains that bear the name, near Bend.

Today the Pattersons run a top-flight equine operation. They have 85 pure Polish Arabians, possibly the largest collection of these horses in the United States. Their 350 impeccable acres of pens, paddocks and pastures look as if they were swept with a giant broom first thing every morning. Every year the Pattersons fly to Poland to buy new stock. Their own sell for as high as $50,000—and have resold for three times that much. But like the passersby who park beside the road to gawk, or the excited school children who come to visit, they are most interested in llamas.

Aside from its obvious charm—if that's the word for a creature that has no upper front teeth and can wiggle its ears one at a time or together—the llama has going for it attributes any livestock breeder can appreciate. It is virtually disease-free. It needs no shots or hoof-trimming. It survives on fresh water, routine worming, an iodized salt block and a mineral lick. It can subsist on as little as ten pounds of second-cut alfalfa a day. Otherwise all it requires is another llama (else it gets lonesome and refuses to eat) and—judging from how they like to stand around rubbernecking unnervingly like a busload of tourists—something to stare at.

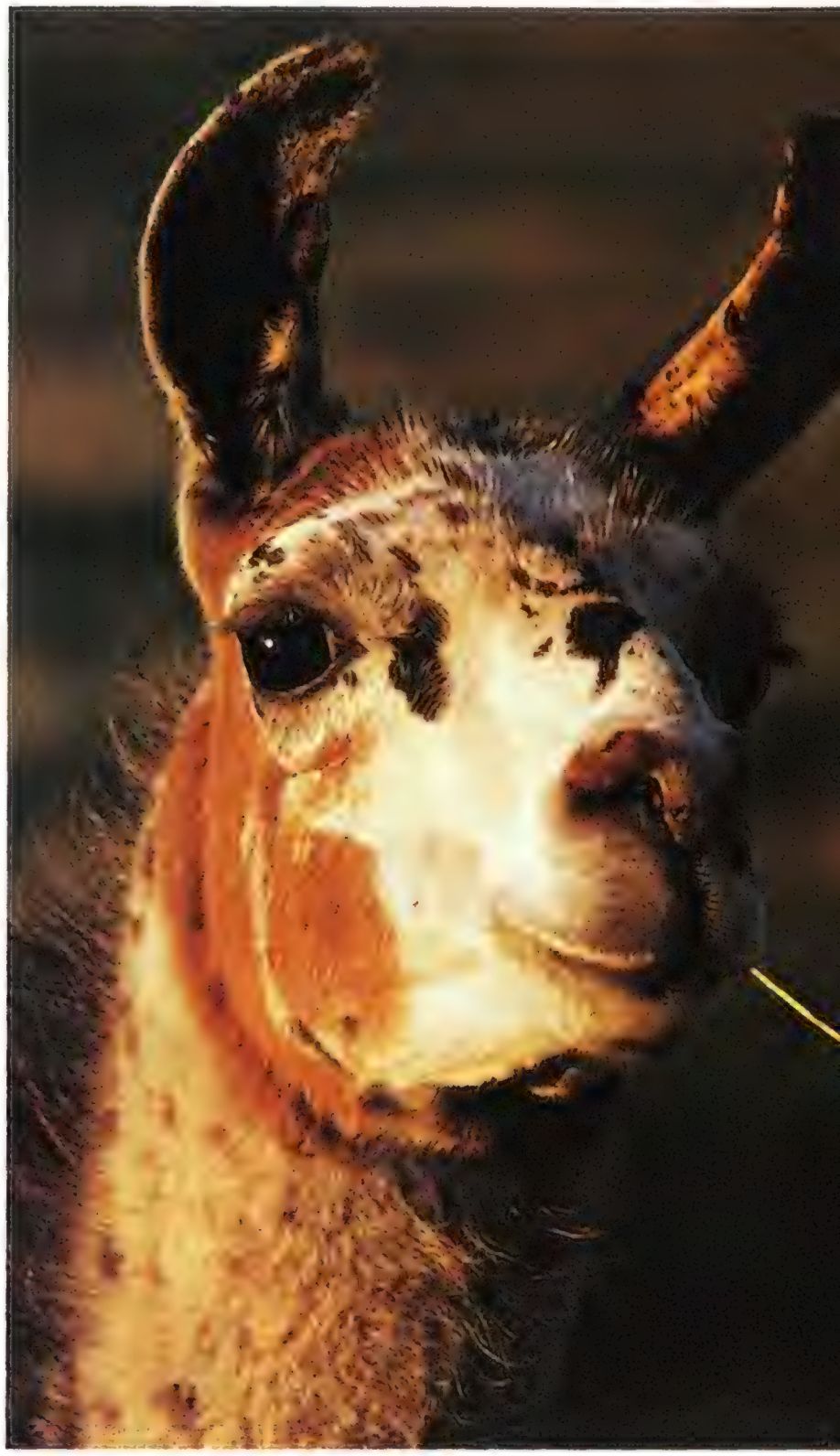
Llamas grow to be between three and four feet high, 350 to 450 pounds in weight, and 12 to 18 years in age. When mature they can live cheek-by-jowl with horses or cattle. Coyotes are not a problem for the babies, which are weaned at six months; the mothers band together to chase the intruders off. As a rule, adults treat each other and the young with uncommon affection and concern, sleeping together in peaceful groups, yielding to the aged, protectively surrounding the newborn.

The higher the altitude and more difficult the terrain, the more the llamas seem to enjoy themselves.

They breed any time of the year from 18 months on and deliver in 11 months, but almost always only a single birth. As Patterson admits, "you can't just crank them out." In his experience, more than 90 percent of all births occur between 9 A.M. and noon—with so little fuss and fanfare you have to check the fields every now and then like a farmwife checks her henhouse for newly laid eggs.

Each year the Pattersons pick the 20 best-looking baby males, put them in a separate field for careful and continuous observation, and at age three select the five finest as potential breeders for their own herd. The ideal is what Kay calls the "Gregory Peck of llamas": erect ears; full, shaggy chest; proud, graceful neck. In addition they keep a sharp eye out for the odd quality male or female for sale by others. Always they must be wary of animals described as "llamas" in good faith. "Some are crossed with guanacos," Patterson says. "You can see the tendency in thinner, finer legs, the dished face, the blockier head."

The Pattersons leave the cooing and cuddling to the "Llama Mama," a motherly woman and nearby friend named Sharon Herriges (p. 124), who runs a combination orphanage, convalescent home, veterinary hospital and country haven for a host of hooved animals, including temporary castoffs from the Patterson herd. The wife of a heavy-equipment operator and the parent of a teen-age girl, Herriges comes from Portland where, she confesses, "the llama pen was always my first stop at the zoo as a child. When they couldn't find me, that's where I was." For the past two years, often around the clock, she has dispensed medicine, treatment and tender loving care to a parade of young



With a straw in its mouth Dusty, a thoroughly acclimated female, eyes camera with calm curiosity.

llamas either sick, prematurely born, or on rare occasions abandoned by their mothers. She may know more about their personalities than anyone else in the country, and finds them intelligent, sensitive, mischievous, responsive and totally winning.

Llamas not only make great pets, my wife and I found on visiting the Herriges home, but with little or no encouragement they make great *pests* as well. The minute the gate is opened to the front yard they are on you like a swarm of Neapolitan waifs, nosing your shoulders and exploring your pockets, batting their big, lashy Mae West eyes and uttering soft, plaintive cries. (Just as kittens purr when content, llamas most often hum, in the words of Swiss naturalist Johann Jakob von Tschudi, like "a number of aeolian harps sounding in concert.")

Herriges rocks the puny babies, nurses them from a bottle of dissolved goat colostrum kept in the freezer, and on rare occasions feeds them intravenously in a playpen at the foot of her bed if necessary. If and when they get diarrhea and grow too weak to gambol on their own four legs outside, she brings them into the house and tricks them up in disposable diapers. "They need a lot of love, a lot of attention, and a lot of security," she says with the authority of a Doctor Spock. "They have to be touched, handled, played with, and held very tight." They look for her when the bell on the microwave oven goes off because they know that's how she warms their bottles. They've seen her disappear up the stairs so often that when they can't find her, they climb the steps and camp in front of her bedroom door.

"I can't recall anyone ever visiting who went away not liking a llama," Sharon Herriges concludes like a proud mother. "I call them gentle aristocrats. I don't think there's another animal that gives so much in return for its care."

Sharon Herriges mothers a premature baby (above) and gets nudge while being watched through window (below). Ailing animals wear disposable diapers.

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By S. Frederick Starr

Why did Russia let Seward's folly go on the cheap?

St. Michael's Cathedral in Sitka, viewed above in the 1880s, was built with aid from Russian-American Company, is shown below as it looks today. Father Ivan Veniaminov, the "apostle of Alaska," was first bishop at cathedral.

Scholars from USSR and America meet at Sitka, rehash the old question, find there are all too many answers

On October 18, 1867, representatives of Czar Alexander II and of President Andrew Johnson met in New Archangel on Sitka Island, Alaska, to transfer control of Russia's vast North American holdings to the United States. Americans joked over their new 375-million-acre icebox and nicknamed it "Walrussia." Russian subjects in the newly American North did not think it so funny, for all the $7.2 million their government received for Alaska. An American officer at the ceremony reported that "down to the last man the Russians in Sitka are behaving as if at the czar's funeral."

The Russians were back at Sitka recently, discussing the sale of Alaska to the United States. This time they were not soldiers but scholars, from Moscow and Novosibirsk. Along with historians, anthropologists and geographers from the United States and Canada, they were participating in a conference on Russia's more-than-century-long effort to turn the Pacific into a Russian sea. Whether sitting at the seminar table, clambering over the ruins of a Russian redoubt or simply watching salmon spawning, the Soviet visitors seemed elated. As Svetlana Fedorova of Moscow's Institute of Ethnography put it, "I've studied this beautiful land for 20 years. It's impossible to believe that I'm actually here."

The Siberian trappers and entrepreneurs who set out for the New World in the 18th century might have voiced similar disbelief, though for different reasons. Those first adventurers faced the turbulent and icy Bering Sea in boats scarcely larger than pleasure craft of today. Life was tough for the few who actually made it to the Aleutians and, later, to Kodiak Island and the mainland. With few provisions, some of these early trappers "went native," adopting fur and hide garments and living in dugouts not so different from their yurts back home in Siberia.

Well into the 19th century the most basic necessities were in short supply. Glass for windows and iron for roofs had to be brought from European Russia. When such materials failed to arrive, many suffered, but some took the lack of amenities in stride. A Russian visiting New Archangel in 1805 came upon the Russian-American Company's local director, Alexander Baranov, as he worked in his "miserable hut," his bed standing in half a foot of water.

Howard Kushner (center) debates with Nikolai Bolkhovitinov (right) of Moscow.

Admittedly, the Russians endured many hardships. The purpose of the 1979 conference, organized by the Kennan Institute for Advanced Russian Studies in conjunction with the American Historical Association, was to answer why. In five days of meetings, several explanations were offered.

By 1800 the Russians had planted imperial emblems along the Alaskan coast as far as Sitka, claiming the land for the czar. The scholars were able to examine one such plate at the Sitka National Historical Park and see for themselves the inscription: A LAND OF RUSSIAN DOMINION. Were the Russians, then, motivated by imperial ambition?

Anatole Senkevitch, an architectural historian from the University of Maryland, provided partial support for this view in his paper on the architecture of Russian America. According to Senke-

An 1828 Russian sketch shows a seal hunt on the Alaskan coast. Drawing was done by Pavel Mikhailov, one of the artists who accompanied Russian exploratory voyages to chronicle visual details of travel in days before photography.

vitch, Grigorii Shelikhov, a founder of what became the Russian-American Company, had planned to build an impressive capital as a fitting symbol of Russia's presence in the American North. In 1784 on Kodiak Island he established the outpost of Three Saints Harbor, which was soon replaced by the more substantial St. Paul Harbor. Using contemporaneous drawings from around-the-world voyages, Senkevitch showed how buildings at St. Paul Harbor embodied the fashionable ornaments of the Russian neoclassical style, and how even warehouses had monumental lunette windows.

Others argued that Russia had little interest in America beyond making quick gains from the lucrative fur trade. Professor Mary Wheeler of North Carolina State University pointed out that the interest of fur merchants, and not the Russian government, was responsible for the initial expansion in Russian America. Russia's merchants and trappers understood full well that the five-foot-long sea otter pelts from the Aleutians were prized throughout the world and could be turned to easy profits. They organized the Russian-American Company to exploit this rich resource, and by 1800 had established a marketing system that extended to Europe, the United States and China, where the furs were especially prized. A Moscow journal of 1835 boasted that 3,178,562 fur seals had been killed between 1786 and 1832—a gory record. And this figure pertained only to the Pribilofs. No wonder the annual catch soon began to diminish.

To their credit, leaders of the Russian-American Company led the way in instituting conservation measures—the first such measures on the Pacific coast, in fact. But overhunting had already taken its toll in drastically reduced yields, causing prices to soar and, as they did, the otter fur collars became an unaffordable luxury everywhere. At the same time European and American fashion ruled fur passé, so that demand by 1840 had plummeted to match the dwindling supply. The fur-based economy of Russian America was never to bounce back from this dual blow. Eventually the Russians were forced to sell Alaska to the United States in order to cut their losses.

Or so claimed Professor Richard Pierce of Queen's University in Ontario. Pierce, an historian whose enthusiasm for Russian America led him to found a publishing house specializing in the field, made mention of some of the Russian trading company's records, which give information on administrative and economic matters and can be found at the National Archives in Washington, D.C.

A more outspoken Canadian scholar, the geographer James Gibson, conceded that the Russians were "incompetent entrepreneurs," but produced other evidence suggesting that their worst losses were sustained in the 1820s, not in the decades before the sale of Alaska in 1867, during which Russia's American operations had been temporarily retrenched.

Alexander Martynov, diplomat-turned-historian from Moscow, denied that Russia's willingness to sell its American colony was prompted by financial losses at all. "Sasha," as he became known, cited documents from Soviet archives to show that by the 1860s Russia's imperial ambitions had come to focus on the Amur basin and China rather than on the New World. With the czar's own brother forwarding the view that Russia had more to gain on the Asian continent than in North America, the sale was inevitable.

Not only was profitability at issue, but the sheer scale of Russia's trapping operations raised questions as to how a group of only 400 to 800 Russians in Alaska ever mounted so huge a slaughter. The Soviet scholars' answer was simple: they didn't. Though good seamen, the Russians from Siberia never learned to handle competently the tricky kayaks that were essential for the hunt. For this and

Author Starr is secretary of the Kennan Institute for Advanced Russian Studies at Woodrow Wilson International Center.

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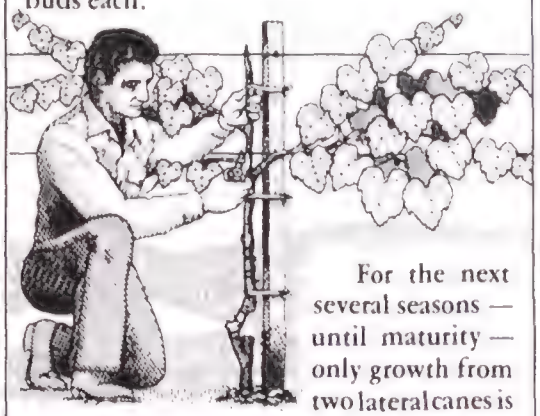

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"Vasilii Govorukhin," possibly Aleut or Tlingit nicknamed by the Russians, was one of sketches from Soviet archives.

many other services, they turned to the Aleuts and later to other native groups. Thanks to the use of local labor, the economy of Russian America came to involve thousands of people.

The sad story of American treatment of the native population during the westward expansion of the United States is by now widely known. The story of Russian treatment of the native peoples of Siberia is still a closed book, since the Soviet archives from which the history could be reconstructed are not readily accessible to Western scholars. But if the Russian treatment of the native Alaskans is any indication, they rivaled and even surpassed the Americans in sheer brutality. Half of all Aleut males 18 to 50 were forced to work for the company for at least three years with meager compensation. Even what they caught on their own was subject to a heavy tax in kind.

To assure the natives' loyalty, the Russians took hostages. In 1790 on Kodiak alone, the Russians held some 300 Aleuts to ensure that 7,200 of their kin would work. With half the adult male population hunting full time for the Russians and many more engaged in provisioning, traditional family organization collapsed. Then disease spread. The impact of Russian practices on the Aleuts can be measured by the catastrophic decline in

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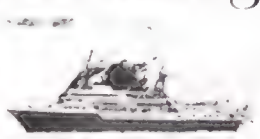

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their population which, some observers claimed, fell by nearly two-thirds in the two generations before 1800.

While the Russians' brutal treatment of the Aleuts cannot be denied, they did take various positive steps to improve conditions. Without defending their forebears' actions in other respects, several USSR scholars noted that the Russian-American Company provided training for the natives in diverse trades, which they applied successfully in the Russian settlements. A group of young "Creole" men (from mixed marriages) was even sent to St. Petersburg for technical training, though, to be sure, most soon perished.

The most important and lasting efforts in behalf of Alaska's native population were made by priests of the Russian Orthodox Church. This story is only now becoming fully known, thanks to the untiring efforts of several Alaskan researchers and also of Bishop Gregory of St. Michael's in Sitka, who has gathered moldering Russian documents from his far-flung parishes to preserve them.

Although they did not forcefully Russify their parishioners, the Orthodox priests of 19th-century Alaska strove to bring the Church to the Aleuts and the Tlingits and to bridge the cultural gulf between them and the Russians. One such priest, the Father Ivan Veniaminov, compiled an Aleut grammar, translated part of the New Testament into Aleut and penned a pioneer study of the Aleut and Tlingit peoples that is still a basic source for anthropologists. No wonder this pious man, the first bishop to serve in Sitka, has been canonized and today is revered as the "apostle of Alaska."

Alexander Baranov, Alaska governor, managed Russian-American Company.

An 1880s picture shows Sitka "castle," old residence of Russian governors.

A high point of the conference in Sitka was the visit to the Bishop's house, where Father Veniaminov lived. It is currently under restoration by the U.S. National Park Service. Alexander Derevianko, a Siberian archaeologist, was enthusiastic about finding such a Russian structure in America: he pointed out to his hosts many details of the hewn-log construction that had been borrowed wholesale from central Siberia. Veniaminov himself was an enthusiastic amateur carpenter, but only a few pieces by him have survived. Fortunately, Derevianko was also able to describe what the house's missing furnishings might have looked like and even offered to help locate antiques in Soviet Siberia for this monument to a Russian saint.

The Russians' efforts to improve the lot of native Americans doubtless was sincere, but the fact that Russia's settlements were dependent on them for their very survival in the New World was not irrelevant. Soviet and North American scholars alike made this point and were seconded by the several Tlingits who attended the conference. Andrew Hope, a local Tlingit historian and poet, called on the oral history of his people to explain this dependence. He pointed out that the Tlingits were not a monolithic, unified force because of the nature of the clan system. Around Sitka the Kiksadi

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Sitka, not far from cathedral, seen in 1870s—the flume in the foreground carried water to power the sawmill, which was not dismantled until 1915.

clan of Tlingits dominated the hinterland, and hence the Russians' principal food supply.

The Tlingits never drove out the Russians entirely, but they did keep the colonists in check and as late as 1866 mounted crippling raids against them. Nor did the Russians dare to strike back indiscriminately, for that would have challenged the Tlingits to cut off their vital supply of potatoes, meat and fish.

Participants in the conference had ample meals of sourdough bread, omelets, fresh salad and fish. The archives revealed that no difficulty facing Russia's American colonists was more obdurate than the problem of food supply. In 1979 produce could be flown to Alaska from Seattle; in 1800 it had to be brought around the globe by ship from European Russia. Many supply ships never reached their destination at all. The ill-fated *Neva,* for instance, sank almost within sight of Sitka Island in January of 1813. Another vessel, loaded with rye flour, made it no farther than the Cape of Good Hope before the cargo rotted. In the five years before 1805 no ship from Okhotsk reached Russian America, thus forcing the residents there almost literally to eat crow—or, more precisely, raven—for the winter. Little wonder that deficiency diseases such as scurvy were rampant. James Gibson reported at the conference that three out of every eight residents of the settlement of Slavorossiia ("Glory of Russia") on Yakutat Bay died of scurvy in one winter in the late 18th century.

If provisioning the colonies was a grave problem, it was one that aroused the Russians to astounding feats of daring and ingenuity. They arranged for goods to be hauled overland from Yakutsk via Okhotsk in Siberia and then by sea, or shipped around the world via Cape Horn or the Cape of Good Hope. They also introduced the cultivation of potatoes in the far North. After much experimentation, they determined that garden crops could be raised successfully on Kodiak Island, from where they were shipped to other settlements from Three Saints Harbor and St. Paul Harbor, the two earliest "capitals" of Russian America. Even Kodiak could not support grain, though, and the Russians' traditional bread diet triggered a search that eventually took them as far afield as California and the Sandwich (Hawaiian) Islands.

The closest Russia came to solving its colonies' grain shortage was through the establishment of Fort Ross, some 90 miles north of the Spanish mission at San Francisco. A substantial settlement was founded there in 1812, along with some outlying farms. Today's visitor to the restored fort quickly realizes that this exposed and rugged coastal land would have been insufficiently fertile to support the northern colonies. To their sorrow, the Russians also discovered this and in 1841 sold Fort Ross to John Sutter, upon whose earlier land grant gold was discovered in 1848. The Russians in Alaska did have other sources of grain. They negotiated to buy wheat in Alta California and even in far-off Chile, and they established purchasing offices in Monterey and San Francisco.

Russia's outposts on Hawaii fared little better than the experiment at Fort Ross. In 1816 Georg Schäffer, a Bavarian-born

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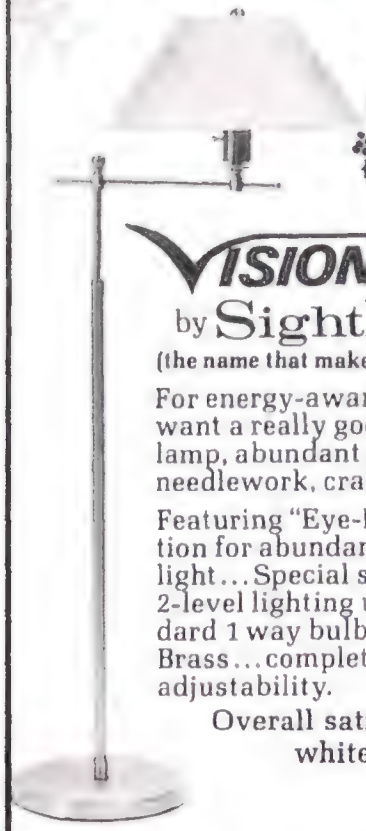

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Behind a gate in the stockade stands restored chapel at Fort Ross, in California, an 1812 Russian outpost that failed to provide grain for Alaska.

adventurer in Russian service, succeeded in establishing the forts of Alexandrovsk and Elizavetinsk on Kauai Island and in renaming the Hanapepe River the Don. But he neither fulfilled his dream of establishing Russian authority in the Sandwich Islands nor secured an agricultural base for Alaska. Well before he could give thought to the food needs of Russian America, he had been run out of Hawaii by Yankee traders. Hitchhiking around the world via Macao, Rio de Janeiro and Riga, the ever-redoubtable Schäffer eventually made it back to the Russian capital. But Czar Alexander I, fearing reprisals from the Americans, disavowed his ambitious schemes. Undaunted, Schäffer headed for Brazil, where he ruled his own little empire under the assumed title of "Count von Frankenthal".

Many of the Alaskans who attended the conference in Sitka were "sourdoughs" by choice rather than birth. For example, Marilyn Knapp, the president of the Sitka Historical Society, was born in Louisiana and drawn with her husband to Alaska.

Few Russians in the 19th century found it so attractive. In fact, with only the scantiest provisions to sustain themselves and with a hostile native population at their doorstep, it is surprising that leaders of the Russian-American Company managed to get any Russians at all to stay in the Alaskan colony. That they did was due in large measure to the strictness with which the company exercised its control. Alaska was a company town and in its day-to-day operations the Russian-American Company followed practices that differed little from the serfdom of European Russia. The company had a monopoly on trade. Workers were paid largely in scrip and had to buy provisions at company stores.

The company, which had difficulty attracting settlers, mainly hired labor on contract. Once there, workers had to stay until their contracts were fulfilled. Many became trapped by mounting debts to the

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In an artist's depiction of signing treaty by which U.S. bought Alaska from Russia, Secretary of State William Henry Seward is seated at left.

company store and in desperation used every opportunity to escape. When a Russian frigate dropped anchor in San Francisco in 1806, two of the crew simply jumped ship. Fort Ross in California was particularly attractive to the potential deserter and in one year six settlers fled. With escape made difficult, rebellion was a constant threat. No uprising actually succeeded, however, thanks to the rigid discipline that prevailed.

Against this background, it is the more surprising that any Russians chose to stay in Russian America, and more surprising still that a many-sided cultural life should have developed there. But it did, and it forms the subject of the most interesting research discussed at the conference. At Sitka there existed an observatory and a library containing books in Russian, French, German and English. Expeditions were organized to explore Russian America and do research on the peoples, fauna and flora of the region. Collections of native artifacts from Alaska and California were assembled and forwarded to the czar's ethnographic museum, the Kunstkammer. They can still be seen in Leningrad.

A network of schools served Russia's Alaskan colony. Down at Fort Ross, probably nobody did more than the commandant Alexander Rotchev to bring the fruits of civilization to this California outpost. Rotchev was a graduate of Moscow University, a skilled essayist and an enthusiastic translator of works by Shakespeare, Schiller and Victor Hugo. His high-born wife created an outpost of courtly St. Petersburg on the rough California coast, regaling her guests with Schubert songs, the poetry of Pushkin and French wines—a decade before the gold rush brought a more rough-and-tumble life to California.

The Sitka conference brought some pleasant surprises for Diane Spencer-Hancock and William Pritchard, who have participated in the state of California's effort to restore Fort Ross to its original appearance. In her presentation at the meeting, Svetlana Fedorova talked about some of the letters and journals relating to life at Fort Ross that are preserved in Soviet archives, where they can be examined by Americans interested in the life of early California.

Other surprises were culled from equally distant sources. If Russian America had an equivalent to the Governor's Palace in British Virginia's Williamsburg, it was the so-called "Baranov Castle" in Sitka (p. 134). Dominating the town from a rocky knoll above the harbor, this combination of residence, office and lighthouse no longer exists, its memory preserved only in a few travelers' sketches, paintings and early photographs. In Sweden, while digging through the family papers of one of the former governors of Alaska, Richard Pierce chanced upon the only known floor plan of the building. As Pierce described it to his audience at Sitka, the "castle," a two-

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story log structure sheathed with dressed planks, may have boasted a ballroom.

Schools, churches, a scientific station, even a "castle"—Russian America was clearly intended by some to be more than a trappers' outpost. But if this is so, why did the colony ultimately fail and its Russian inhabitants return to Siberia? This question rang through five days of discussion. Many explanations were offered and others doubtless will be added in the book the Kennan Institute intends to publish, based on the meeting.

Alexander Martynov, who earlier had joined the debate on the profitability of the colony, presented an interesting argument: it was not Russian America that failed so much as czarist Russia itself. It had suffered a humiliating and unexpected defeat in the Crimean War in 1855, which in turn hastened the collapse of the government's finances. In a concerted effort to get the country back on its feet, the reform-minded Czar Alexander II abolished serfdom, established a new court system and began rebuilding the army—all just when the sale of Alaska was under consideration in St. Petersburg. These departures, plus the new horizons for imperial expansion presented by a faltering China, caused Russia simply to lose interest in its remote American colony.

An historian from Fairbanks asked whether Russia could have held on to Alaska. Maybe, Martynov replied, "but when czarist Russia was defeated in the Russo-Japanese War of 1905, the colony would have been handed over to Japan or the United States anyway."

Did American policies bring about the collapse of the colony? The role of the United States in Russia's Alaskan failure was the subject of a spirited debate between Howard Kushner of San Diego State University and Nikolai Bolkhovitinov of Moscow's Institute of History. At issue was a question that is as pertinent today as it was in 1867: was the Alaskan contact between Americans and Russians characterized by confrontation or cooperation? Did these superpowers of the 19th century deal with one another in a spirit of intense rivalry or of détente?

On certain points Kushner and Bolkhovitinov were in agreement. Both acknowledged that from the late 1700s, the Russians found themselves up against eager American seamen and entrepreneurs from as far away as Boston and New York. At first they resisted.

But the need for supplies and trade relations soon encouraged them to cooperate. In the early 1800s joint Russian-American hunting expeditions were mounted, the Russians sold Alaskan furs to Yankee captains and bought Yankee supplies and ships to carry provisions to their northern colonies. Increasingly, though, the Russians grew alarmed at

In a contemporary cartoon the Russian iceman cometh, to swap a chunk of ice (Alaska) for a bag of gold. Peering around corner is a suspicious John Bull.

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persistent American incursions into the area. In 1821 the directors of the Russian-American Company successfully lobbied the pliant Czar Alexander I to issue a ukase forbidding all foreign ships from 100 miles of Russian land in the Pacific north of 51 degrees latitude—a kind of Monroe Doctrine in reverse. But this "hard-line" policy proved unenforceable.

As to characterizing relations, the scholars could not agree. Jabbing the air with his hand, Kushner reminded his colleague from Moscow that American seamen had armed the Tlingits against the Russians and never had hesitated to poach furs in Russia's Alaskan waters. The mild-mannered Bolkhovitinov, one of the Soviet Union's leading authorities on American history, countered that these were exceptional incidents in an otherwise harmonious relationship. "The Russians needed the Americans' help," he argued, "and the Yankees reaped substantial benefits from their cooperation with the Russian-American Company."

The debate was carried on with great vigor, extending beyond the formal meetings to mealtimes and to late-night chats over Siberian vodka. But it was not resolved. Bolkhovitinov's views found support among several scholars from the United States and Canada, as well as from his Soviet colleagues, while Kushner's carefully argued position won the respect of several other researchers from all three countries. If there was a superpower confrontation over 19th-century Alaska or not, the former capital of Russian America witnessed a remarkable case of Russian-American cooperation in 1979.

Four conferees pose behind old Russian cannon. From left: Nikolai Bolkhovitinov and Alexander Derevianko, from USSR; Mary Wheeler, Howard Kushner, of U.S.

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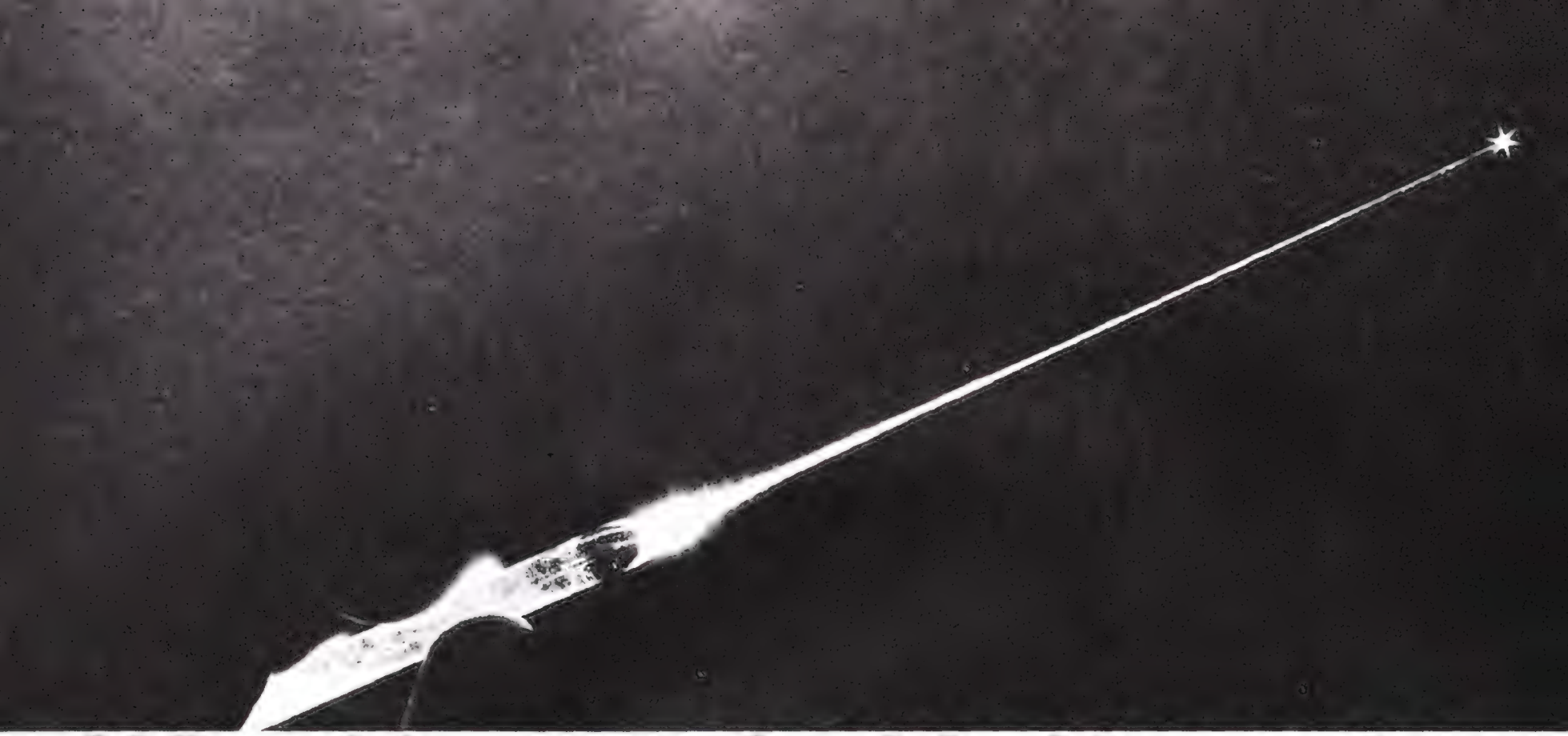

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An Erté Woman helps form the letter "L" in the artist's humanoid *Alphabet*; series of lithographs took him 50 years, was released in 1977 when he was 85.

By Stella Blum

Erté's rare world, a hothouse mix of elegant design

In the '20s and '30s his dazzling works dressed showgirls, society and Mata Hari; today they dress museum walls

In a sense it was the Erté Woman who drew me to the artist himself. Thumbing through some old issues of *Harper's Bazaar* when I was a teen-ager, I discovered the Erté drawings. I remember feeling at the time that the catlike women he drew, draped in ermines and pearls, were even more glamorous than the movie stars in Hollywood of those days in the early 1940s. What also struck me was that although the magazines were nearly 20 years old, the designs had such a timeless quality that they looked contemporary.

I even copied one of them, but sadly in my small upstate New York town there was no place to wear such an elegant reproduction. The graphic fluidity of line and the masterful control of his technique so impressed me that for a time I tried to emulate his style of drawing until I discovered that for Erté the subject and the handling of it were interlocked in a highly personal way and therein lay his genius.

Today, after more than 60 years in graphics, fashion, costume and theater design, Erté is the last of the great Art Deco artists. At 87 and still at work in Paris (p. 154), he looks with pleasure upon his own revival. His magazine covers, his lithographs, gouaches and fashion drawings are mounted by galleries and museums, cherished by collectors and devotees of pop culture. The Metropolitan Museum of Art owns some 200.

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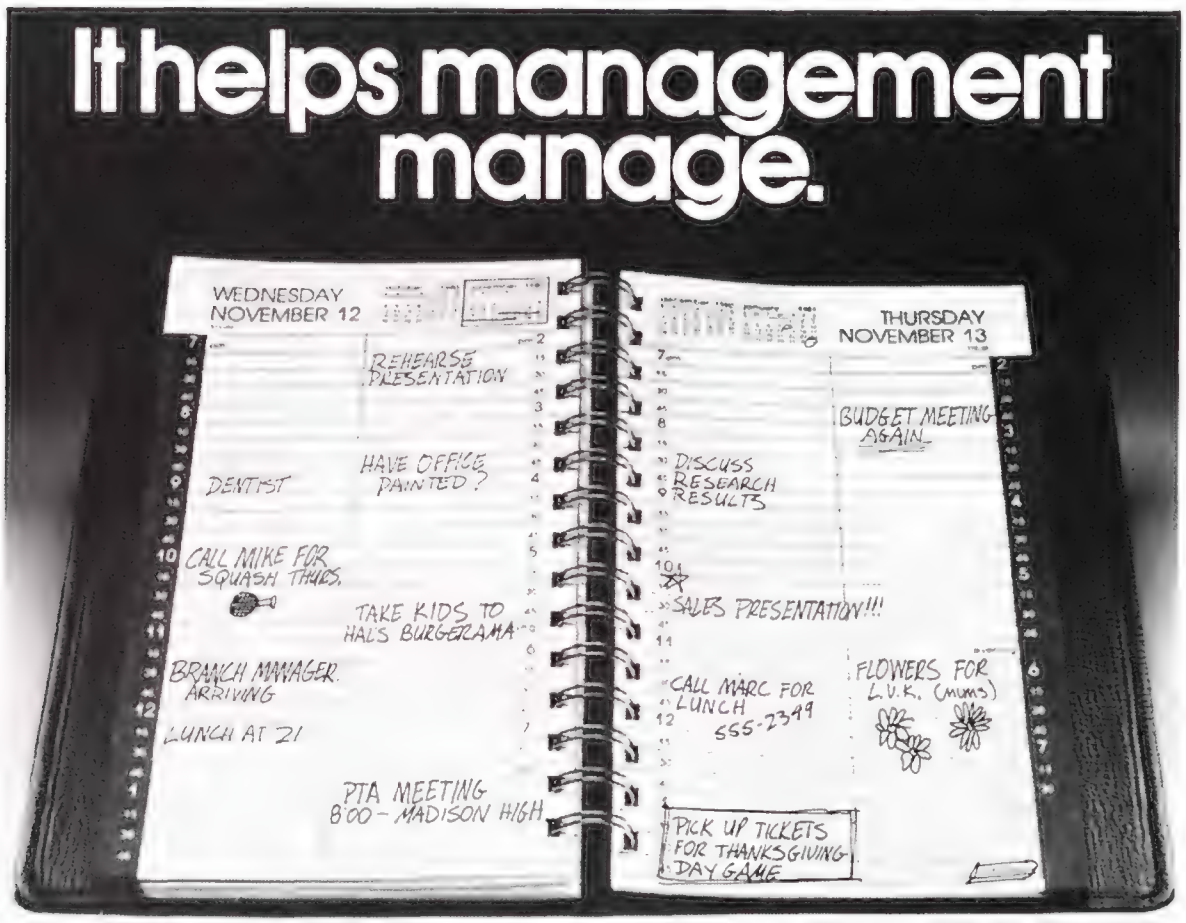

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The revival of interest in Erté's work began in the late 1960s, after decades of neglect, and is partly credited to nostalgia—the 1920s and '30s were far enough behind to be considered history—and partly to a recognition of his superb designs and remarkable technical achievements.

Over the years, the artist dressed manikins, Follies showgirls, Parisian dancers and Hollywood actresses—Carmel Myers, Norma Shearer, Aileen Pringle, Joan Crawford, Paulette Duval. A costume for dancer Mata Hari in 1913 was one of his first theatrical assignments and he later recalled: "This legendary creature . . . was not really beautiful. She had a sensuous body, but she lacked personality. . . . I was never convinced that she had the intelligence to be an effective spy."

Stella Blum is curator of the Costume Institute at the Metropolitan Museum.

All Erté works © Sevenarts Ltd.

in *Ragtime,* Ballet Theatre of Angers, France: these are gouaches, 1975.

In many ways Erté is almost a work of art himself. Even his name is a creation, the French pronunciation of the initials of his Russian name, Romain de Tirtoff. Physically he is small. His erect posture and the proud tilt of his head reflect his Tartar ancestry. Exquisitely groomed, he subtly but carefully coordinates what he wears. His gentle, elegant manners and whimsical good humor make him delightful company. He likes festivities, openings and attention and wears his fame as though he were born to it.

A naturally skillful raconteur with a vivid memory, he is able to conjure up his colorful past with great clarity. During the Metropolitan Museum of Art's exhibition, "The Glory of Russian Costume," on loan from the Soviet Union, Erté was nearly overcome with nostalgia as we walked through the galleries.

"For me," he said, "these clothes bring back wonderful memories of my childhood, my home, my family and especially my mother, whom I deeply loved." He went on to talk about the St. Petersburg he knew in the early 20th century, the gaiety, the colorful festivals, parties, museums, theaters and palaces.

Erté returns to his early childhood

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when he discusses the influence on his work: "One night when I was quite young, she (my mother) had come to my room to give me a good-night kiss before going to a ball. She wore a dress of black chantilly lace over pink taffeta; around her décolletage was a garland of real roses. I was absolutely enchanted by the perfume and beauty of her image. Perhaps this was the beginning of my love for all things connected with beautiful clothes and elegance."

His drawing had other influences. The stylized techniques, he said, were partly inspired by Greek vases: on days when he did not have to go to school he would rush off to gaze at his "beloved vases" at the Hermitage Museum. Another major influence was a book in his father's library illustrated with Persian and Indian miniatures. Erté's later unique use of color and precise attention to detail show an Oriental flair. When Erté women are painted dripping with pearls, often each bead is a pinpoint of pigment, layer after layer meticulously applied.

Romain's father was an admiral and the family was among St. Petersburg's social elite. Both his parents loved music and had a permanent box at the theater.

He became a frequent visitor to the Mariinsky Theatre where the greats of the Imperial Ballet Company performed. Here he saw Pavlova, Karsavina and Nijinsky. He was present when Nijinsky, arriving late, appeared on stage without his underwear. He recalls with a great deal of mirth the consternation of the Czar's mother, who was also in the audience. Erté did not meet Diaghilev until 1921. If there is any regret in his life it is that his straitened financial position made him turn down Diaghilev's invitation to design for *The Sleeping Princess* in order to accept a more lucrative offer from the *Greenwich Village Follies.*

Erté speaks with equal objectivity about his early days in Paris. He had left home in 1912 because he simply felt that Paris was where he could best express his talents. His later successes have erased the ache of those early days and his failure as a designer for a fashion house called "Caroline." He recounts with mischievous glee Caroline's advice that he had no future as a dress designer: " 'I want to give you a mother's advice,' she said. 'Give up the idea of becoming an artist. You have no talent for it.' "

In early January 1913 Erté began to work for Paul Poiret, one of the most famous French couturiers of that era, and here he designed under the Poiret label. Through Erté's association with Poiret, which lasted until the outbreak of World War I in 1914, the young designer was exposed to some of the most creative decorative art in Paris. He also learned about the workings of the fashion and theater world. Later these would become the tools of his independence.

Erté was beginning his climb up in the

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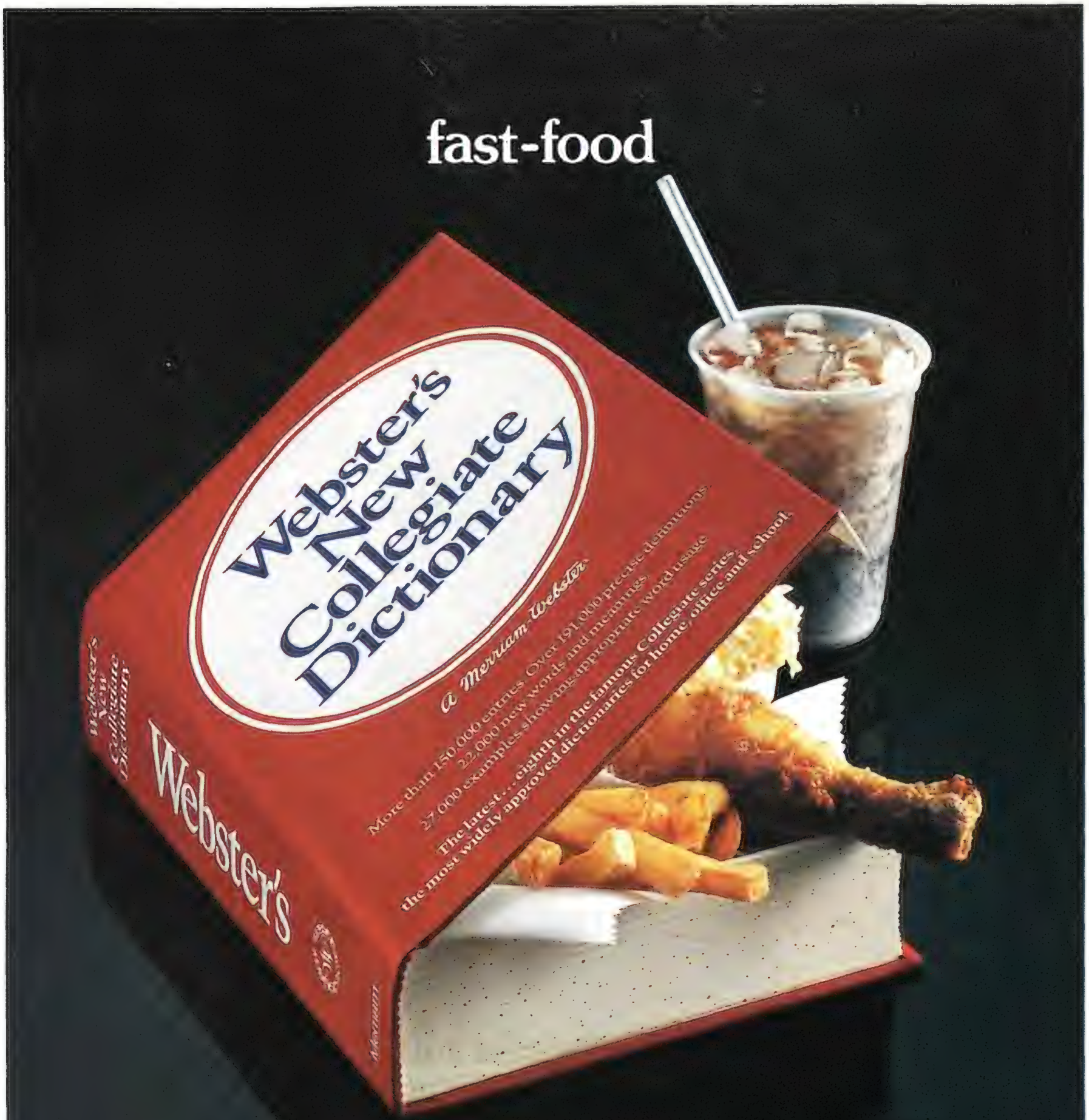
Diaghilev: Erté regrets turning him down. This is Cocteau's sketch.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Erté dresses as *Clair de Lune* for gala at Monte Carlo Sporting Club, 1922.

flamboyant and public world of design, worlds away from the family-oriented days in Russia when he happily fabricated characters out of his mother's empty perfume bottles, which he filled with colored water and trimmed with bits of lace and chiffon. He recalls affectionately one of his first successful designs, an evening dress, drawn in colored pencils for his mother when he was about five. "She had it executed and it was a big success, as she said."

Some of the first dresses Erté sold under his own name were purchased by Henri Bendel. Later he also sold some to Altman's in New York. But this was only one aspect of his work. In the May 1913 issue of *La Gazette du Bon Ton,* a highly artistic fashion magazine, Erté's signature appears for probably the first time under two hat designs. In January 1915 Erté did his first cover for *Harper's Bazaar,* and also some unsigned drawings. This eventually led to a ten-year exclusive contract with the Hearst publication, and another contract after that.

During the years when he was working for *Harper's Bazaar,* Erté started designing for music hall spectaculars, opera and theater, both in Paris and New York. He even spent a somewhat frustrating year in Hollywood designing for the movies.

Theater was a natural outlet for Erté's dazzling imagination, particularly the

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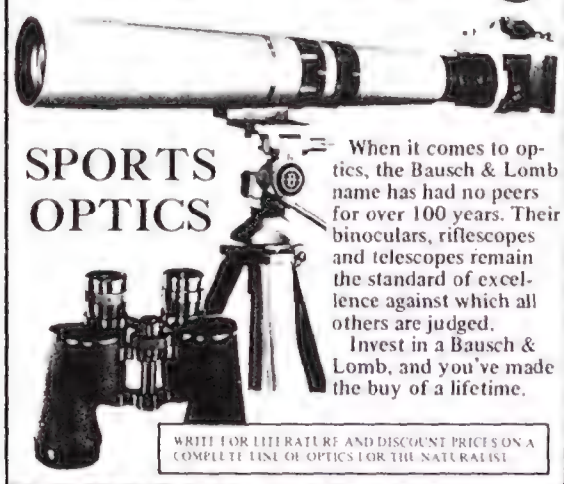

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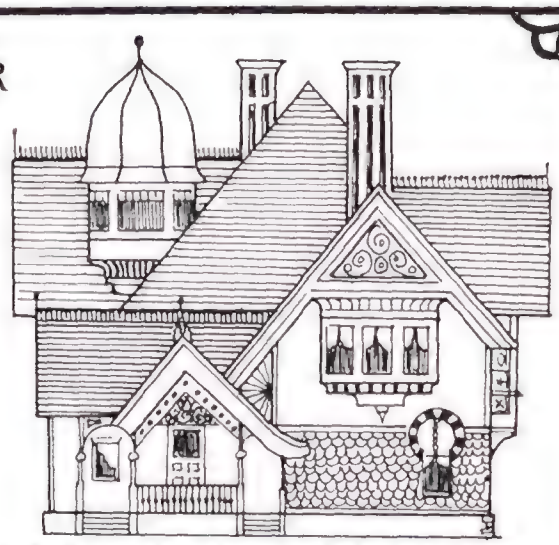

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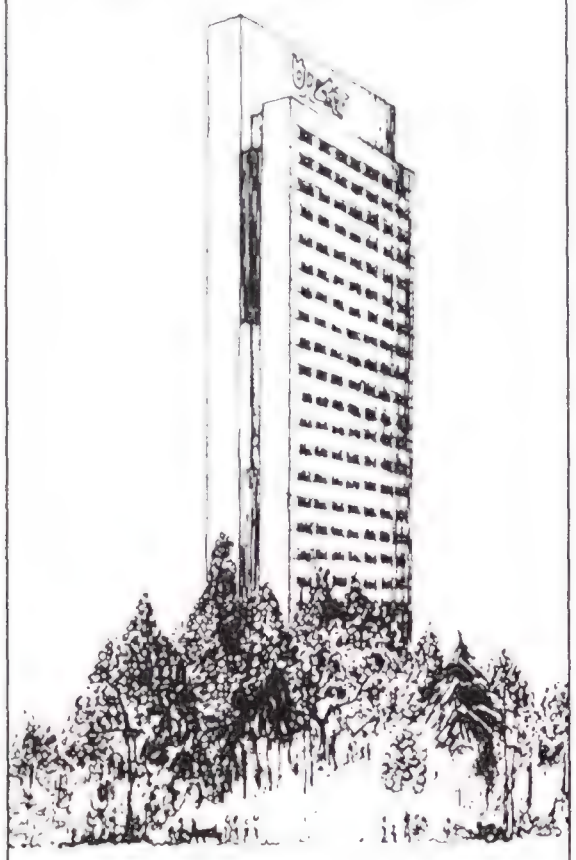

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spectacular revues of the 1920s—*Folies-Bergère,* George White's *Scandals, Moulin Rouge,* the *Ziegfeld Follies.* With incredible attention to detail, Erté designed sets and costumes to match. Snowy showgirls descended a golden staircase; a gigantic "bird" seated on her eggs hatched down-colored baby-bird girls (who were specialty dancers); on-stage vegetable patches were "planted" with human carrots wearing orange turbans and tendrils of green leaves. The sets for the *Ziegfeld Follies'* production "Gold" used six-and-a-half miles of gold lamé.

Certainly for Erté there were no little basic black dresses; but there were plenty of pearls. He was devoted to fringes, tassels, braid, jewels, slits, feathers and furs. At times models had to cope with head-to-floor headdresses, ear-to-elbow earrings and mountains of fur; at other times, they had little more to cope with than a few pearls. So enchanted was Erté with his own creations that he couldn't resist dressing up in some of them to attend galas and fancy dress balls (p. 152).

These months Erté is busy with costumes, scenes and props for *Der Rosenkavalier* for the 1980 Glyndebourne Festival in England. Two years ago, on his 85th birthday, he released his now famous *Alphabet* collection of lithographs which took him 50 years to do, working in his "spare time." The result is a characteristically unique series of 26 letters using the human and animal form (p. 147).

Idealized self-portrait, 1969; for another view see current photograph below.

Retirement is not a word for Erté. He still works in Paris, often at the same simple oak table he ordered after World War I; the top tips to make an easel and the drawers hold his tools and keep tubes of paint tidy. His happiest years have been spent working at this table. Once when I sat next to him at a dinner party while other guests spoke of their families and their children, he leaned over to me and quietly said, "You know, for me my work has been my mother, my wife, my friend, my mistress and my children—it has been my life."

Erté's works are mounted on folding panels of his Paris apartment where he has lived for 45 years; he now is designing sets for *Der Rosenkavalier.*

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Book reviews

Saloons of the Old West
Richard Erdoes
(Alfred A. Knopf, $12.95)

The Saloon on the Rocky Mountain Mining Frontier
Elliott West
(University of Nebraska Press, $14.50)

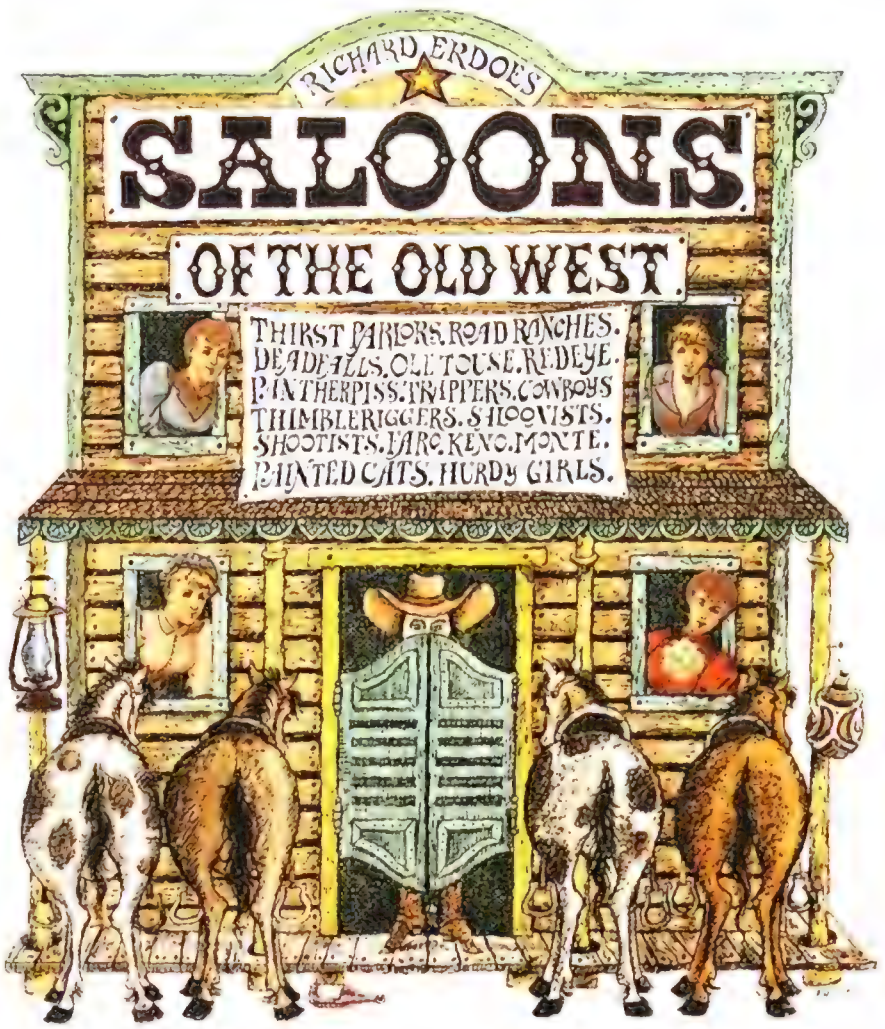
The saloon of the Old West makes for an elusive legend. Despite attempts to reduce it to quaint Americana as digestible as the Model T and the cigar-store Indian, the saloon defies being pigeonholed. Do we believe the media-nurtured image of a 60-foot walnut-and-brass bar tended by a handlebar-mustachioed mixologist and patronized by the classic Western ilk—dapper mining barons elbow-to-elbow with rough-cut cowboys—or do we swallow saloons as dark and dingy, crawling with villains and degenerates, and breeding social maladies?

Historic evidence supports both tableaux, along with a host of others. What, then, is the saloon? These two books address the irresistible subject gingerly, avoiding generalizations for the most part, documenting with newspaper reports and letters from the era, and drawing on folklore and literature to dramatize a point. Neither author is so pompous or self-serious as to shun a good anecdote, and each book abounds with yarns that bespeak the rude glamour of the Westerner's drinking domain.

Richard Erdoes, author of several books on Native American tribes and co-author of the mysteriously lyrical *Lame Deer, Seeker of Vision* (SMITHSONIAN, May 1973), appears to have had a good time researching and writing *Saloons of the Old West* and illustrating the dust jacket (below). Erdoes' love for detail becomes evident as one peruses his latest work, sopping with hundreds of facts (Leadville, Colorado, in 1879 had "120 saloons and 118 gambling houses and private clubs selling liquor") and delightfully useless tidbits (Erickson's Saloon in Portland had a bar measuring 684 feet), merged with an examination of the saloon phenomenon from its roots in Colonial American taverns to its decline with the onset of the temperance delirium.

Erdoes dismantles the Western saloon shot glass by beer mug, paying plenty of attention to minutiae like the pomade on the bartender's carefully created cowlick, or the portrait of undraped femininity equipped with hidden air hoses that caused the beauty's bosom and navel to undulate.

Like Erdoes, Elliott West (a history professor at the University of Texas) maintains in *The Saloon on the Rocky Mountain Mining Frontier* that the barroom served as a safety valve for the overwhelming squalor and severity of life in the frontier West. He also notes its function as a male sanctuary and meeting place. Because he confines his study of the saloon to Rocky Mountain mining purlieus and because he appears to lack the penchant for incorporating every smidgen of research—as in Erdoes' rambling exposé—West's book is more compact and precise. But it also treats the genesis, rise and decline of the saloon, including its role as the entertainment hub of a mining



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town: a locale of painted ladies, prizefights, amateur orchestras and bands, a Shakespearean classic performed by errant thespians, even caged and growling grizzlies displayed for the gawking public's delight.

West and Erdoes differ primarily in tone. West approaches the saloon with the reserve and objectivity of a serious historian; Erdoes plunges in, absorbing every facet and angle and sieving out little in the process. A good deal of West's book smacks of academia (in one chapter, readers unexpectedly confront a table comparing the wealth distribution of Leadville saloon operators). This, coupled with statistical appendices and pages of notes and bibliography, imparts an aura of scholarship that, in light of the subject, seems a tad sober.

Overall, West's book is worthwhile for its thoughtful evaluation of a bygone tradition; Erdoes' work shines for its sheer revels in delicious trivia. Both writers are convinced that no volume, however serious or all-encompassing, can ever synthesize all the folklore and testimony surrounding the saloon into an archetype, nor can it dispel the myths that envelop things past. Together, they contribute to our understanding of the role of the Western saloon—without destroying its fantasy.

—John Sullivan
Denver writer and critic

Sojourners
Philip McFarland
(Atheneum, $19.95)

Neither making history nor writing it is a modest proposition. Philip McFarland's far from modest and rather eccentric narrative, *Sojourners*, is about men and women who made history and/or wrote it from the middle of the 18th century to the middle of the 19th. Into the vast scheme of his book McFarland incorporates the lives or "sojourns" of Washington Irving, Aaron Burr, John Brown, Mary and Percy Bysshe Shelley, John Jacob Astor, Sir Walter Scott and others.

Such figures left their marks on events through word and deed: in adventure and autobiography and biography, in politics and literary pioneering, in social reform, in new kinds of history writing itself. The breadth and scope of their endeavors take on a collective allure when you realize that most of the people in *Sojourners* knew, or at least knew of, one another; the very diversity of their experiences made for surprising contacts.

McFarland anchors his account in Washington Irving's career, and from that the other characters spin off. Driven by dreams or by suffering—the distinction is McFarland's—they traversed large territories of land and mind. Such travels were so bold that they actually turned these coiners of myths and folklore into legendary figures. *Sojourners* attempts to root them in a reality of place and time.

That world, viewed from the perspective of our somewhat calloused present, seems to glow with a wonderful intensity. It felt the convulsive, heady impact of Romanticism in its many forms, from heightened emotionality and agonized sensitivity to the often violent eruption of new social and political orders.

Deep and romantic melancholy also flourished; even the apparently sanguine Washington Irving struggled with it throughout his life. In part, inner demons visited this eternal bachelor as the result of several unhappy love affairs; McFarland places love for women and the love objects themselves in the grand Romantic tradition. But melancholy often had more hidden causes—in social insecurities and professional tension. Irving advanced his reputation to world renown and was the first American to give his nation's literature international stature. But, like Walter Scott, he paid the price in artistic strain and psychic vulnerability. Mary Shelley lost several children in their early infancies; although, while still in her teens, she gave birth to *Frankenstein*.

McFarland's rambling chronicle also reflects the sheer mobility of the period. By "sojourners" he means wanderers, explorers, seekers with conscious and unconscious quests. Some, like John Jacob Astor and the imperial-minded Aaron Burr, set out to monopolize whole new worlds, while others, Irving and Scott among them, enjoyed traipsing imaginatively through older ones.

They seem to anticipate Henry James' later travelers, changing habitations and traversing continents in search of food for thought, guides to culture and means to marriage. Social mobility was as active as physical movement, and motion often switched into the high dramatic gear of political exile, social ostracism and spectacular elopements. Time was as eagerly crisscrossed as space.

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McFarland does not skirt the stopping-off places along his travelers' ways. Cities, neighborhoods, houses take as real shape as the events located graphically inside them, and we watch Irving construct his Sunnyside, Scott his Abbotsford. In McFarland's descriptions many of these partly legendary structures still stand haunted and haunting; he seems to have visited them all.

Such fondness for detail, however, is McFarland's downfall. His work is based on letters, journals and books from which he quotes too extensively. His enthusiasm for his material is more disorderly than contagious, and his approach is less authoritative than authoritarian. Retelling substitutes for analysis. He operates within a framework of mysterious chronological simultaneity, often tenuous connections and contrasts, and unexpected digressions that gradually take on a life of their own.

In fact, the only way to enjoy McFarland's text is to let it wash over you in all its excesses, to recognize it as an idiosyncratic labor of love. *Sojourners* ultimately captures the frustrating essence of history itself: confusion, randomness, the old lurking in the new, and the insistent recurrence of things coming full circle.

—Celia Betsky
Instructor in English, Rutgers University

Disturbing the Universe
Freeman Dyson
(Harper & Row, $12.95)

Having just imbibed the delights of Lewis Thomas' *The Medusa and the Snail*, syndicated columnist Ellen Goodman recently confessed to the prejudices it had contradicted: "Scientists, after all, rarely even use our language. . . . They seem to be as interested in sharing their world and its mysteries with the laity as the medieval churchmen were in educating the masses in Latin. They wanted faith, not comprehension."

I find evidence of the tenacity of such prejudice mildly surprising. It may no longer be possible for laymen, no matter how inquisitive, to fathom the full content of science. But this is no reason to suppose that its pursuit is inexplicable, or that scientists are disinclined to try.

A splendid example of a scientist wanting very much for people to comprehend is Freeman Dyson—mathematician, theoretical physicist and an eminent professor at the Institute for Advanced Study in Princeton for more than a quarter century. *Disturbing the Universe* is his engaging chronicle of the intrinsic excitement of science and of the dilemmas that beset one impelled to weigh the purely existential aspect of his pursuits against disquieting potentials for unanticipated consequences.

Scientists, yes, once tended to ignore those potentials. Moreover, there was a time when quite a few of them were imbued with the wonderful conceit that they could soon declare their enterprise completed. Today they may have a handle on tools that laymen cannot grasp, yet they also have a profoundly humbling sense that theirs is a pursuit which may "disturb" the universe but is without end. It is a pursuit, then, that embodies powerful inducements to try to make outsiders understand the motivations of its practitioners.

Which is not to imply that one ought to believe Dyson when he says that "almost any scientist of my generation" could have told a tale similar to his. For not only is he exquisitely literate, he also has a subtle concept of history—setting his keynote by borrowing Leo Szilard's yarn about what he said when he told Hans Bethe that he was going to keep a diary: "I don't intend to publish it; I am merely going to record the facts for the information of God." "Don't you think God knows the facts?" Bethe asked. "Yes," said Szilard. "He knows the facts, but He

Freeman Dyson

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does not know *this version* of the facts."

And so here we have Freeman Dyson's version of the facts. His is intimate, intensely so, with a shifting pace and moods that run a gamut from unbending rationalism to unabashed mysticism. Throughout are echoes of British literary giants, from Milton to H. G. Wells to T. S. Eliot (Dyson's title is courtesy of Eliot's Mr. Prufrock—called, in one of the book's few editorial gaffes, Alfred J. rather than J. Alfred). Occasionally there is a Whitmanesque strain too, and Dyson's "Ride to Albuquerque" with his hero Dick Feynman is reminiscent of nothing so much as Jack Kerouac and Neal Cassady.

Withal, what Dyson discloses is a personality that embodies an awesome intellect and at the same time all sorts of traits that are perfectly ordinary. Here is someone who mastered differential equations in a few weeks at the age of 16. Likewise, here is someone who second-guesses himself, who is ambivalent and philosophically eclectic, and who sometimes feels a sense of "bewilderment." Like us all.

Dyson casts his book in the form of a series of episodes, loosely structured, that take him from his Winchester, England, childhood to graduate study under Hans Bethe at Ithaca, to an apprenticeship with Robert Oppenheimer at Princeton, and thence to his professorship spiced with a diversity of endeavors at Ann Arbor, Berkeley, San Diego, Los Alamos, Livermore, Santa Barbara, Jackass Flat and Washington, D.C. And all the while what he is really describing is a compelling intellectual odyssey.

The final episode, "Dreams of Earth and Sky," blends fantasies of a flight with his son George in "an elegant little two-seater spaceship" (an actual drive over the Golan Heights with an Israeli friend), and ultimately a meeting with God, who turns out to be a three-month-old baby. Pretty mystical stuff. Yet one finishes with a feeling that Dyson has admirably achieved his aim of showing "people who are not scientists the way the human situation looks to somebody who is a scientist." And he has done even better at delineating the various imperatives behind his assertion that "it makes no sense to me to separate science from technology, technology from ethics, or ethics from religion."

—Robert C. Post
Historian of science, Museum of History and Technology, Smithsonian Institution

Carnival in Romans
Emmanuel Le Roy Ladurie
(George Braziller, $20)

The walled town of Romans lay west of Grenoble on the River Isère in the French Alpine province of Dauphiné. Sixteenth-century tax rolls ranked its 7,500 citizens in four categories: bourgeois patrician landowners; merchants; craftsmen; and agricultural workers, who provided cheap farm labor in the fields stretching beyond the town's ramparts.

From patrician to plowman, they were bound by ties of kinship, custom and economic interest to the countryside where life and work were disrupted by religious wars that in the 1570s had degenerated into banditry and converted the province into a military camp. To protect their towns and rural communities from soldiers and bandits, the craftsmen and peasants formed armed leagues, but, in their demands for abolition of the tax exemption claimed by the nobility, they soon coupled social protest with self-defense.

In Romans, the local leaguers banded together under the charismatic leadership of a draper called Paumier, who for a year defied the town's elected officials and overawed their meetings with his commanding presence. Patricians and merchants, jarred by the revolutionary rhetoric of Romans' "lower orders," moved steadily along the path of reaction, encouraged at every step by the royal judge, Antoine Guèrin. The clash of class and personalities reached a violent climax during the pre-Lenten Carnival in 1580. The surrealistic drama that unfolded there is the subject of Emmanuel Le Roy Ladurie's latest book to appear in English.

Le Roy Ladurie belongs to the *Annales* school of historical research. His methodology is to collect every conceivable detail relating to life in a particular locale at a particular moment in its history. The evidence is then fitted together in a mosaic that makes a comprehensive statement about the place and period observed, imposing historical discipline on sociology and anthropology.

In *Carnival,* he explains the typology of social revolt and explores the complexities of the French legal system and tax mechanism in the 16th century. He examines the cultural institutions of Dauphiné and the social structure of Romans. He sketches psychological profiles of the protagonists in the story—allowing Guèrin to emerge as the villain of the piece. And, in the book's most intriguing chapters, he interprets the "symbolic grammar" of the Carnival.

Pagan in its origins, Carnival resembled more a midwinter festival anticipating the fertility of spring than the prelude to a Christian season of penitence. From Candlemas to Mardi Gras, Romans submitted to the whim and fancy of the courts of rival Carnival kings, each disguised as an animal character bearing some primitive significance and each representing a complex alliance of neighborhoods and civic corporations.

The elaborate masquerades turned political in 1580, however, and became grotesque metaphors for the social and political tensions that had been stewing in Romans during the preceding year. Dances and mimes staged by Paumier's faction became acts of sedition. The banquets and balls of the patricians and merchants became a cover for arming the forces of "law and order." On the next to last day of Carnival, Guèrin provoked a confrontation with the popular party. Paumier was shot to death. Leaders of the local league who survived the night of violence were brought to trial before the royal judge. Some were sent to the gallows, others sentenced to long terms in the galleys.

In all, between 20 and 30 were killed in Romans—by the brutal standards of religious wars and peasant revolts, not quite the "massacre" Le Roy Ladurie insists it was—but sufficiently bloody to subdue the town's leaguers and warn other rebellious factions of Dauphiné.

Carnival lacks the style and accessibility that attracted a wide range of readers to Le Roy Ladurie's study of Montaillou (SMITHSONIAN, March 1978) and made it a nonfiction best seller last year. Perhaps Guèrin's journal, on which Le Roy Ladurie relies extensively, is simply not as colorful and revealing as the records of the inestimable Bishop of Pamiers' Inquisition. But *Carnival* deserves to be regarded as the work of a serious and articulate scholar. He has marshaled a wide variety of sources to tell as much as a historian can know about the dramatic and, in context, significant events in Romans—and to make educated speculation about what cannot be known.

—Robert Rinehart
Foreign Area Studies
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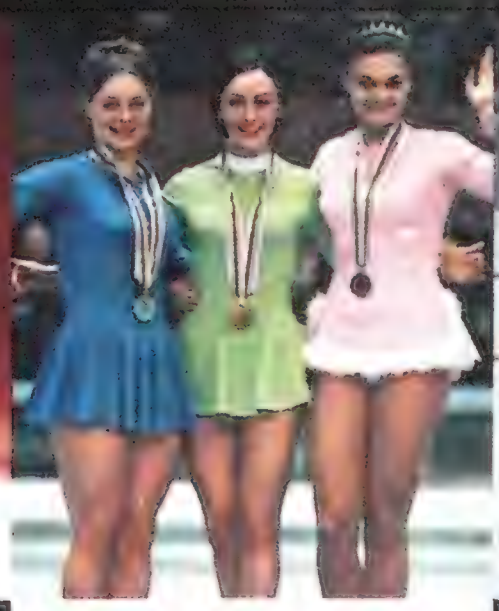

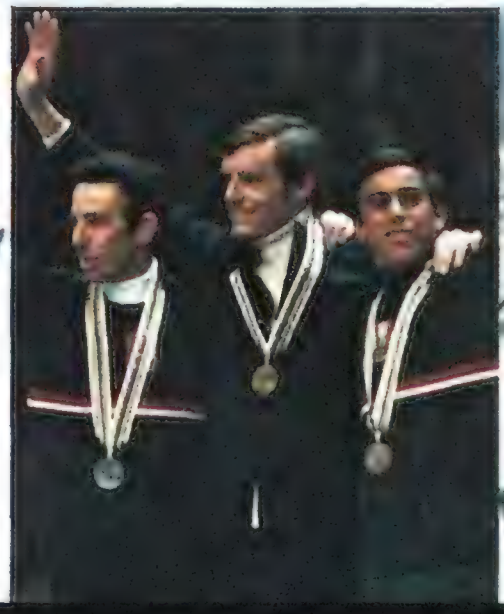

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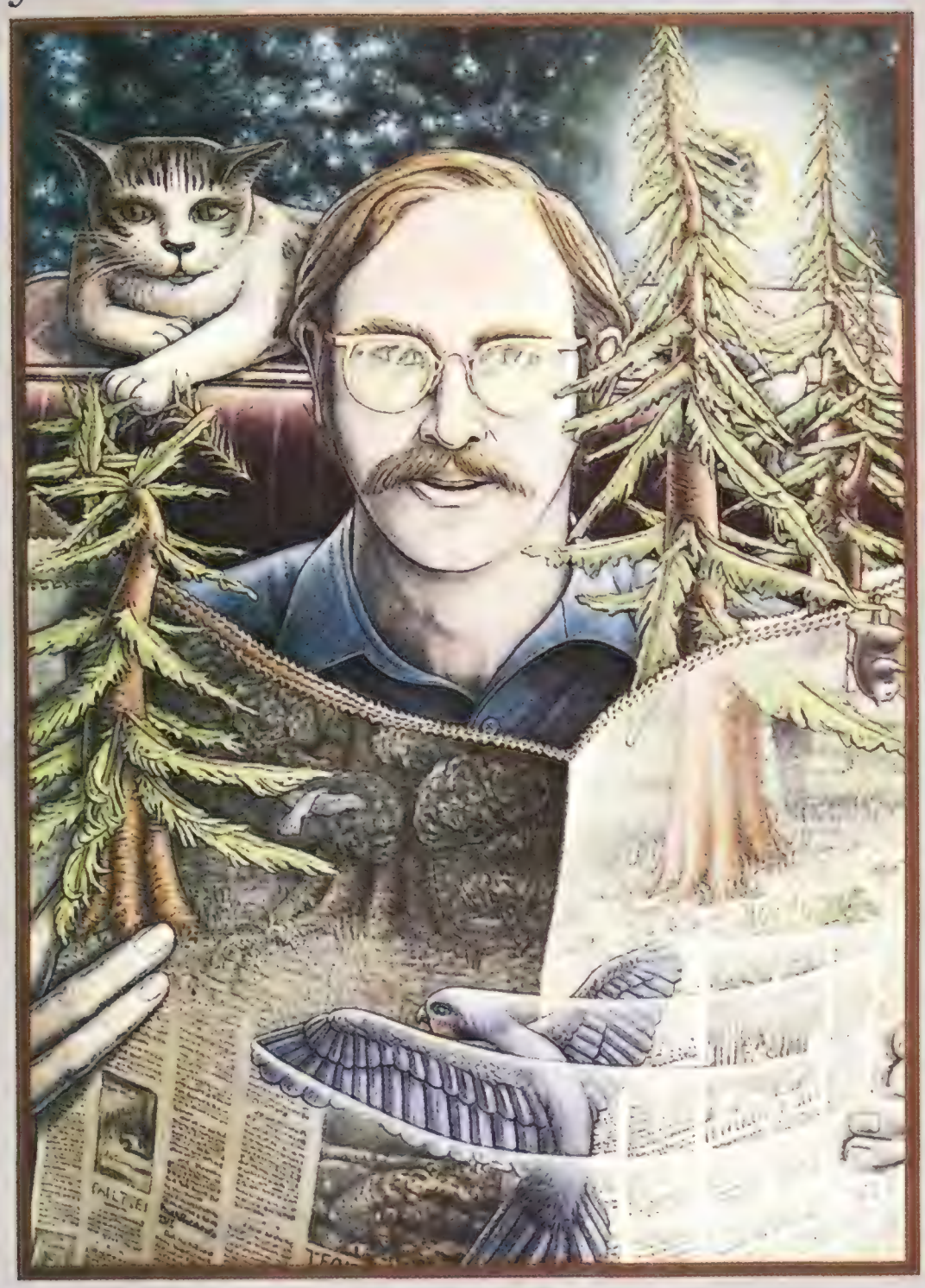

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Smithsonian highlights

For December, three Smithsonian museums are observing the holidays in style. All museums are closed Christmas Day.

The Hirshhorn Museum and Sculpture Garden plans a four-hour entertainment of cartoons, folk singing, skits and other performances Saturday, December 1, from 10 A.M. to 2 P.M. This fourth annual Hirshhorn Holiday is open to youngsters age six and up, accompanied by an adult.

The Museum of African Art celebrates *Kwanza*, the African-inspired harvest and New Year festival, December 26-January 1. The packed schedule includes crafts workshops, lively performances, a special feast and candle-lighting ceremonies.

And at the Museum of History and Technology, Christmas will be everywhere during the annual Holiday Celebration, December 26-31. Side by side with the exhibits on Americana will be more Americana—puppet shows, cookie-making demonstrations, choral groups, dramatic readings and family films. The Headsville Post Office will sell Christmas stamps and will be trimmed with greens from West Virginia, the original location of this one-room general store. The Museum's central corridors will be lined with 13 "trees of Christmas," an exhibition organized by the Office of Horticulture. The eight- and 12-foot trees are specially decorated, among them a cookie tree, decoupage tree, origami tree, and trees representing Sweden, Germany, Poland, Brazil, Lithuania and France (right). After the exhibit, the trees will be planted outdoors.

When in Cambridge, Massachusetts, you may want to visit the Harvard-Smithsonian Center for Astrophysics, which sponsors free programs in popular astronomy on the third Thursday of every month. "Observatory Nights" feature a lecture, film and, weather permitting, telescopic observing on the roof.

MHT's "French Tree of Paradise"

Air & Space Museum
Blue Angels and Thunderbirds (December 13, 7:30 P.M.)—Program on Air Force and Navy flight demonstration teams.
Sky Devils (December 5, 7:30 P.M.)—Free showing of this 1932 comedy.
Christmas Stars (December 1, 9 A.M.)—Monthly sky lecture considers the stars of Christmas, Albert Einstein Spacearium.

Anacostia Neighborhood Museum
Kwanza Workshops (December 5-14)—Weekday programs in preparation for Afro-American adaptation of African harvest festival (see above); for schedule, call 381-6731.
Children of South Africa (through December 31)—Photographs by South African Peter Magubane.
Out of Africa: From West African Kingdoms to Colonization (until June 1980).

Cooper-Hewitt Museum (New York)
Cooper-Hewitt Collection: Furniture (December 4-February 3).
Smithsonian (through January 6)—Objects from the Institution's vast collection (SMITHSONIAN, November 1979).

Freer Gallery of Art
Art of the Court of Shah Tahmasp (December 16-March 30)—Islamic works executed during Shah's lifetime, 1514-1576; coincides with National Gallery of Art showing of miniatures from same period.
A Decade of Discovery: Selected Acquisitions 1970-1980 (through May 1980)—Works span 2,000 years of Eastern history.
Imperial Mughal Albums (newly opened exhibit)—Indian 17th-century paintings.

Museum of African Art
Kwanza (December 26-January 1)—Harvest and New Year festival (see above).
Ceremonies and Celebrations (opens early December)—Exhibition illustrating rites of passage and seasonal and religious festivals of the New World.
Useful Arts of Kenya (ends January).

Museum of History & Technology (MHT)
Trees of Christmas (December 14-January 2)—Annual exhibition (see above).
The Afro-American Tradition in Decorative Arts (through December 30).

Museum of Natural History (MNH)
Swedish Rock Carvings (through January 13)—Photos of Bronze-Age carvings.
Eskimo Narrative (through December 31).
Illustrated Lectures—"Eskimo Art" by Dr. Jean Blodgett of Winnipeg Art Center, December 1, noon; "Wilkes Expedition" by Dr. Herman Viola, National Anthropological Archives, December 7 at noon.
Family Films—Program of two Disney films repeated December 21, 28, noon; December 22, 29, noon and 2 P.M.

National Portrait Gallery
Robert Edge Pine: A British Portrait Painter in America (through January 6).
The Great Crash (through April 20)—The story of the stock market collapse.

Renwick Gallery
Ryijy Rugs from Finland: 200 Years of a Textile Art (December 21-March 16)—Exhibition circulated by SITES traces two-century development of ryijy from folk art to fine art.
A Century of Ceramics in the United States 1878-1978 (through January 27).
Harmonious Craft: American Musical Instruments—Traveling exhibit, American Craft Museum, New York City, through December 30.

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(signed) Joseph J. Bonsignore
Associate Publisher

National Collection of Fine Arts

Drawings of Morris Louis (December 6-February 3)—Works exhibited for first time examine the first two-thirds of his career, from 1930s to 1953.

Hugo Robus (1885-1964) (ends March 2).

Seymour Lipton: Aspects of Sculpture—Traveling exhibit, Jewish Museum, New York City, through January 20.

Hirshhorn Museum & Sculpture Garden

Fernando Botero: A Retrospective (December 20-February 10)—First retrospective in America to honor this 47-year-old Colombian artist who often places rotund characters into settings as parodies of "official" art (below).

Oscar Bluemner: The HM&SG Collection (through March 2).

Hirshhorn Holiday (December 1, 10 A.M.-2 P.M.)—Children's funfest (see p. 168).

Botero's *Mona Lisa, Age Twelve,* 1959

Smithsonian events

Special events and performances in December are listed below. For tickets, call (A) 202-381-5157 or (B) 202-381-5395, as noted in the listings.

Discover Puppeting! (through December 30)—Eric Bass and Japanese-inspired rod puppets, Discovery Theater, A&I, Wednesdays-Fridays, 10, 11:30 A.M.; Saturdays-Sundays, 11:30 A.M., 2 P.M. (B)

Honoré Daumier, Poet and Populist (December 1, 9 A.M.-4 P.M.)—All-day seminar on his art and life commemorates 100th anniversary of his death, Carmichael, MHT. (A)

Desmond Guinness: The Houses and Castles of Ireland (December 3, 2 P.M., Carmichael; 8 P.M., Freer.)—Author traces history of Irish architecture. (A)

A-Ak (December 4, 8 P.M.)—Korean troupe performs elaborate court rituals;

free lecture-demonstration December 3, 8 P.M., Baird. (B)
Conversations with Smithsonian Specialists (December 4, 11, 18; 10 A.M. or 6 P.M.)—Weekly series on behind-the-scenes museum work, Ecology Theater, MNH. (A)
Woody Herman and the Young Thundering Herd (December 8, 6 P.M.), Baird. (B)
20th-Century Consort (December 10, 8 P.M.)—Chamber music, Baird. (B)
Furnishing the White House: Past and Present (December 10, 1 P.M.)—White House Curator Lorraine W. Pearce discusses renovation, Carmichael. (A)
U.S.-China Relations: Where Do We Go From Here? (December 13, 8 P.M.)—Lecture by China specialist Dr. Harry Harding, Carmichael. (A)
The Echo Singers (December 16, 3 P.M.)—Black gospel music by quintet, Baird. (B)
Smithsonian Jazz Repertory Ensemble (December 27) Carnegie Hall, New York City. (B)

Regional Events

The Smithsonian is again going on the road. The 1980 tour season of the National Associate Program's Regional Events series begins in late January with a week of lectures and workshops in Miami and Palm Beach.

Other cities on the 1980 schedule include San Antonio (March), Des Moines (April), St. Louis (May), Grand Rapids (May), Pittsburgh (September) and Anchorage and Fairbanks (October).

National Associates in the above cities will receive invitations to events approximately one month in advance. Associates who spend the winter in Miami or Palm Beach but who receive SMITHSONIAN magazine elsewhere may request invitations by writing to: Regional Events, 1208 A&I, Smithsonian, Washington, D.C. 20560.

Membership benefits when visiting the Smithsonian

The Associates Reception Desk, in the castle, is open from 10 A.M. to 4 P.M. daily for registration, event-exhibit information and orientation material.

The Associates Lounge in the castle, a quiet place to relax, is open from 10 A.M. to 5:30 P.M. daily.

The Members' Dining Room, **"The Court,"** in the Museum of Natural History, is open Monday through Friday for lunch (11 A.M.-3 P.M.); on weekends for breakfast (8:30 A.M.-11 A.M.) and for brunch (11 A.M.-3 P.M.).

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Radio Smithsonian

This music and conversation program is broadcast weekly on approximately 50 stations across the country. For details, consult your local fine arts radio station. (A different schedule of programs is heard in Washington, D.C.)

Ten Years Since Tranquility Base—A look at the impact of Apollo 11 (week of December 2).

Diving for Gold—Underwater exploration expert Mendel Peterson tells about seeking sunken treasure ships; *American Art-New Directions*—Diversity in art as seen in HM&SG exhibition (week of December 9).

Sounds of the Duke—Highlights of new Smithsonian album of Duke Ellington's Orchestra (week of December 16).

Who Came Before Columbus?—Two anthropologists explore controversies; *Pioneer in Metal*—Work of sculptor David Smith (week of December 23).

Life in a Coral Reef—A look at a living reef in an 1,800-gallon tank at MNH; *Before Broadway*—American theater in early days (week of December 30).

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington, D.C. To sponsor a show in your community, write to Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some December exhibits:

West Palm Beach, Florida (December 29-January 27)—*Edison and the Electrical Age,* Science Museum and Planetarium.

Sioux City, Iowa (December 8-January 6)—*American Drawings II,* Sioux City Art Center.

Detroit (December 15-January 13)—*Dorothea Lange: Her Collection,* Detroit Historical Museum.

Flint, Michigan (December 15-February 3)—*20th-Century Sculptors and Their Drawings: Selections from the HM&SG,* Flint Institute of Arts.

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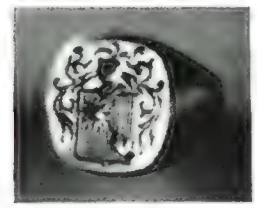

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New York: March 14-17 or April 11-14: Special lectures, visits to the Morgan Library, the Frick and Metropolitan Art museums; also includes theater and opera performances.

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Big Bend—April 26-May 5: Hike the spectacular canyon trails in this southwest Texas wilderness park.

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Coming in May: Hopi/Navajo Culture; also **History of the Federal City,** a five-day study program in Washington, D.C.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

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Mayan Mexico: Yucatán Peninsula—December 5-17, January 8-20 or February 5-17: A complete tour of the Mayan ruins of the Yucatán. (Tour originates and ends in Mérida.)

New Zealand—February 20-March 7: Tour includes talks on natural history, the Maori heritage, parliament and home visit. (Tour originates and ends in Los Angeles.)

Winter Russia*—December 28-January 11: Leningrad, Tallinn and Moscow plus optional two-day excursion to Vladimir and Suzdal; activities include gala New Year's Eve party, troika ride, visits to schools, factories, theater, circus.

Chilean Highlands—January 17-February 2: Rugged outdoor learning experience for small group. Raft down the Bío-Bío River and hike with a naturalist to glaciers, volcanoes, waterfalls and forests.

Egypt-Israel Cruise—March 17-April 7: Join noted archaeologists and anthropologists for a three-day program in Cairo and a 17-day cruise aboard the *Argonaut.* From the Red Sea port of Safâga, visit Luxor, Karnak and the Valley of Kings. From Aqaba, travel to Petra and the Wadi Rumm on the Arabian Peninsula. Transit the Suez Canal for Palm Sunday weekend in Jerusalem and Haifa. Continue to the Greek islands of Santorini and Crete, arriving in Athens for the colorful Easter celebration.

Ecuador and the Galápagos Islands—April 18-May 1: Visit Quito, then travel by train to Guayaquil to board the *Buccaneer* for a seven-day voyage through the famous Galápagos Islands. Participate in shipboard study seminars; meet with scientists at the Charles Darwin Research Station; observe the rich plant, bird and animal life.

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Russia*—May 18-June 1: Leningrad, Tallinn and Moscow; see the Hermitage, the Kremlin and fabulous Petrodvorets Palace; visit schools, factories, clinics, theater and the unique Russian circus.

London*—May 25-June 8: A full program in London with special lectures, walking tours, theater and excursions. A five-day travel seminar into the English countryside offers a selection of areas to be visited.

Isles of Britain—May 30-June 15: From London and Southampton, circumnavigate Great Britain, with visits to Dublin, Conway in North Wales, Edinburgh and Dover. The cruise also includes fascinating lesser-known destinations in the Isles of Scilly, the Inner and Outer Hebrides, the Shetlands and the Orkney Islands.

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People's Republic of China: 12 tours from March through October with four different itineraries: important cities and archaeological sites in the northeast; historic cities of central and southern China; Chang Jiang (Yangtze) River gorges; Xinjiang (Sinkiang) and the steppe regions of central Asia.

*Indicates optional predeparture course.

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American Antique Furniture—March 16-21: Connoisseurship of masterpieces, 1650-1840. Includes color slides of great collections, detection of fakes, advice on care of antiques, as well as tours of the elegant Diplomatic Reception Rooms of the Department of State and Winterthur Museum.

China: A Cultural History—March 23-28: Prehistory to the enigmas of today, with emphasis on the intellectual and artistic traditions and the great philosophies and religions. Includes recent films and tours of the outstanding collection of the Freer Gallery of Art.

Genealogical Research—March 23-28: (Repeat of popular program)

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A Grand Tour of the Solar System—April 20-25: Leading scientists in planetary exploration at NASA share their new knowledge, using spectacular slides and time-lapse films made during the most recent missions. Includes activities at Goddard Space Flight Center and the U.S. Naval Observatory.

The Arts of Japan—May 18-23: Prehistoric culture to the present with emphasis on the great philosophies, religions, and impact of other cultures. Includes films and tours of the Freer Gallery of Art.

Please send requests for full information on content, accommodations and fees by seminar title to Selected Studies, A & I 1190A, Smithsonian Institution, Washington, D.C. 20560 or telephone (202) 381-6434 for details.

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By Wes Woodruff

Up, Up and... but how does he find away?

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He uses water, too, but where's Europe?

For a number of months, millions of moviegoers have gone to local theaters and come away believing "a man could fly" after watching the big, new wide-screen *Superman* epic. The special effects were indeed breathtaking, etc., but the movie still provided no answer to a question that's been gnawing at some people for years—how does Superman find his way around? Exactly how does the Man of Steel navigate to the precise spot he's needed (usually in the nick of time), and does he ever get disoriented or even lost as he streaks high above Metropolis or a vast stretch of ocean?

The subject has never before been addressed, but we can make some educated guesses based on Superman's performance in the comic strips, the movie version and in the TV series. The topic has been subjected to close scrutiny by several of my Air Force navigator colleagues and our students, and several interesting possibilities have come to light.

First, Superman obviously relies on local knowledge of the Metropolis metropolitan area for short, close-to-home missions. He glances down now and then as he flies along to check his bearings, using familiar landmarks for reference.

Viewers may recall from the old TV series that he always flies a standard departure pattern away from the Daily Planet building, since the same scenery always flashes behind him. Doubtless, he proceeds to an established reference point, or "fix," from which he's memorized the correct course and bearing to many destinations, such as Lois' apartment, major banks and museums, jewelry stores and, of course, the crooks' hideouts.

Since he has super memory, he probably has several thousand such places memorized and with telescopic and x-ray vision, it's simple to "home in" on a destination. In the movie, for example, he reaches one crook's hideout simply by following city streets.

For strategic missions, a new problem arises. Even with super memory, the Man of Steel could not possibly anticipate every location throughout the world where his services might be needed. So, for long-range missions, Superman surely has a few devices up his sleeve to help. Perhaps he carries a small inertial navigation system (INS) with him on long overwater legs. Such a system is used in most modern airliners to give a constant readout of present position, distance to go, time to destination and distance off course. With his super knowledge from the planet Krypton, the Man of Steel may have fashioned an INS the size of a cigarette pack that would not arouse suspicion when he is disguised as Clark Kent, mild-mannered reporter.

As a backup to his INS system, Superman may have some other aids available similar to those we use on global missions. He could use his x-ray vision as a Doppler system, bouncing electromagnetic energy off the Earth's surface to determine drift and ground speed. His supersensitive ears probably can detect minute changes in winds and weather patterns, and his super vision might serve much like a sextant to determine his position from the stars and sun. Like the birds (SMITHSONIAN, June 1979).

With a variety of navigation aids, the Man of Steel may have a navigation system superior to anything we use and, even if one component malfunctions, his backup systems can still put him over his target right on schedule.

Of course, this is all conjecture. But at the speeds at which he flies, Superman must utilize some highly sophisticated instruments since he needs highly accurate information in a hurry or he'll never rescue Lois in time.

Since he must exceed the speed of sound, one wonders if he has special permission from the Federal Aviation Administration for supersonic flight over the continental United States. This is restricted for most civilian and military aircraft. With his super vision, he undoubtedly can spot approaching air traffic many miles away and execute collision avoidance maneuvers. Still, it must be quite a sight for airline passengers to see a man in red-and-blue tights streaking past their windows at a speed of several thousand miles per hour!

Perhaps in the sequel, *Superman II,* some of the Man of Steel's navigational secrets will be revealed. In the meantime, speculation and debate will continue and some of us will return to see the film again in hopes of picking up a few useful tips from Clark Kent's alter ego.

Every time Superman flies "Up, Up and Away!" to defend Truth, Justice and the American Way, one thing is sure as he pursues his appointed rounds "Faster Than a Speeding Bullet." He certainly finds his way around better than a whole classful of my students!

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